USAF DIRECTORATE OF PROCUREMENT
AEDC/PKP
ARNOLD AFB TN 37389-1332

1. Attached is Invitation for Bid (IFB) Number F40650-01-B-0008.

2. BIDDERS MUST SET FORTH FULL, ACCURATE, AND COMPLETE INFORMATION AS REQUIRED BY THIS INVITATION FOR BIDS (INCLUDING ATTACHMENTS). THE PENALTY FOR MAKING FALSE STATEMENTS IN BIDS IS PRESCRIBED IN 18 USC 1001.

3. **Affirmative Action Requirement:** Please note the affirmative action requirement of the equal opportunity clause which may apply to the contract resulting from this solicitation.

4. **Sources:** All responsible sources may submit an offer which will be considered.

5. **Mandatory Registration in the CCR**: Effective May 31, 1998, all prospective awardees are required to be registered in the Central Contractor Registration (CCR) (52.232-33, Payment by Electronic Funds Transfer [CCR]). The CCR database provides the information necessary for the Government to make payment using electronic funds transfer. Contractors may register via the Internet at http://ccr.edi.disa.mil.

6. **Base Access:** AEDC is a U.S. Air Force installation, and individuals who are neither U.S. citizens nor immigrant aliens must be authorized to visit. Such authorization is granted only on a Government-to-Government basis. Application should be made through the appropriate embassy in Washington, D.C. For purposes of this requirement, immigrant aliens may be admitted upon presentation of their U.S. Alien registration card. U.S. citizens or immigrant aliens representing or employed by a foreign Government or foreign-owned firm are considered to be foreign representatives and must apply for authorization to visit through the appropriate embassy.

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	F40650-01-B-0008	☒ SEALED BID *(IFB)* ☐ NEGOTIATED *(RFP)*	22 June 2001	1 22

IMPORTANT - The "offer" section on the reverse must be fully completed by the offeror.

4. CONTRACT NUMBER	5. REQUISITION/PURCHASE REQUEST NUMBER	6. PROJECT NUMBER
		999109

7. ISSUED BY CODE	8. ADDRESS OFFER TO
USAF Procurement Branch 100 Kindel Drive, Suite A332 Arnold AFB, TN 37389-1332 Buyer/Symbol: Eric Yatsko/PKP Phone: (931) 454-4347 email: eric.yatsko@arnold.af.mil	See Item 7

9. FOR INFORMATION CALL	A. NAME	B. TELEPHONE NUMBER *(Include area code) (NO COLLECT CALLS)*
	Eric Yatsko	931-454-4347

SOLICITATION

NOTE: In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, identifying number, date):*

REPLACE PWT OFFICE BULDING ROOF - BUILDING 740 IN ACCORDANCE WITH ATTACHMENT 2, SPECIFICATION NO. 999109, DATED 27 MARCH 2001. ATTACHED AEDC DRAWINGS PUT10069, DRAWINGS 390-71AA AND REFERENCE ONLY DRAWINGS.

AWARD IS TO BE MADE PURSUANT TO THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM.

11. The Contractor shall begin performance within 10 calendar days and complete it 120 calendar days after ☐ award, ☒ notice to proceed. This performance period is ☐ mandatory, ☐ negotiable. *(See* FAR CLAUSE 52.211-10 *.)*

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12B.)*	12B. CALENDAR DAYS
☒ YES ☐ NO	10

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 1 copies to perform the work required are due at the place specified in Item 8 2:00 *(hour)* local time 24 July 2001 *(date).* If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee ☒ is, ☐ is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by

D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will not be considered and be rejected.

OFFER *(Must be fully completed by offeror)*

14. NAME AND ADDRESS OF OFFEROR *(Include ZIP Code)*	15. TELEPHONE NUMBER *(Include area code)*
	16. REMITTANCE ADDRESS *(Include only if different than Item 14)*
CODE FACILITY CODE	

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this accepted by the Government in writing within _____ calendar days after the date offers are due. *(Insert any number equal or greater than minimum requirement stated in 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)*

AMOUNTS ▶ CLIN 0001 - REPLACE PWT OFFICE BULDING ROOF - BUILDING 740 IN ACCORDANCE WITH SPECIFICATION NO. 999109

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGEMENT OF AMENDMENTS
(The offeror acknowledges receipt of amendments to the solicitation - give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD *(To be completed by Government)*

21. ITEMS ACCEPTED

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN ▶ *(4 copies unless otherwise specified)*	ITEM 7	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO ☐ 10 U.S.C. 2304(c) ( ) ☐ 41 U.S.C. 253(c) ( )
26. ADMINISTERED BY CODE		27. PAYMENT WILL BE MADE BY
		DFAS-DY/FV, 1050 FORRER BLVD. DAYTON, OH 45420-1472

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign document and return _____ copies to the issuing office.)* Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this

☐ 29. AWARD. *(Contractor is not required to sign this document.)* offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31A. NAME OF CONTRACTING OFFICER *(Type or print)*	
		W. RICHARD STEWART	
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

SPECIAL CONTRACT REQUIREMENTS

1. SAFETY

The Contractor will obtain AEDC/SE coordination to assure adequate safety coverage. The Contractor shall take or cause to be taken such additional measures as the Contracting Officer may determine to be reasonably necessary for the protection of life and health of employees and other persons and for prevention of damage to property, materials, supplies, and equipment. The Contractor shall comply with safety rules (tags and work clearances) of the AEDC Support Contractor at interface points of new construction and modifications to existing systems and with AEDC Base Safety Standards.

2. UTILITIES AVAILABLE

(a) Water: All reasonable required amounts of potable and raw water will be made available without cost to the Contractor from existing systems, outlets, and supplies near the vicinity of the work. All water shall be carefully conserved. All temporary connections and piping installed by the Contractor shall be removed in a manner satisfactory to the Contracting Officer prior to final acceptance of the work.

(b) Electricity: All reasonably required amounts of 60 HZ electric power at 110V and 480V will be made available without cost to the Contractor from existing electrical systems near the vicinity of the of the work. The Contractor shall install and maintain at no cost to the Government any necessary supply connections and facilities in a manner satisfactory to the Contracting Officer. All electrical service shall be removed in a manner satisfactory to the Contracting Officer.

3. TECHNICAL SURVEILLANCE

The Government designates the Air Force Project Engineer and the AEDC Support Contractor to perform technical surveillance. They will recommend to the Contracting Officer acceptance or rejection of work under this contract. All references to the "construction monitor" within the project documents shall be understood as referring to the AEDC Support Contractor personnel performing technical surveillance on behalf of the Government.

4. SANITATION

The Contractor shall provide toilet facilities in a ratio of not fewer than one for each 30 persons or fraction thereof. Connections to existing sanitary sewer manholes may be made. The Contractor shall supply drinking water from connections to the existing potable water system. The Contractor shall take proper precautions to protect the water system from damage and contamination. Any temporary connections made for drinking water or toilet facilities shall be removed by the Contractor in a manner satisfactory to the Contracting Officer before final acceptance of the work.

5. EXISTING UNDERGROUND UTILITIES

The location of existing underground utilities as shown on the contract drawings has been taken from as-built drawings. There may be underground utilities which are not shown on the contract drawings and these utilities may be dangerous if ruptured. If the Contractor unearths or strikes any underground utility not shown, the excavation work shall cease and the Contracting Officer shall be notified immediately. The Contractor shall determine with caution the exact location of such utilities and will not proceed with further excavation unless otherwise advised by the Contracting Officer.

6. DISPOSAL AREAS

An approved disposal area is about 2 miles from the work site. This area is approved for scrap metal, iron, and other related iron and metal waste from the construction sites. Light materials that may be windblown

must be secured with other solid types of waste. A dumpster is located near the work area for disposal of small waste such as office waste, workers' lunch debris, and other small items.

7. SECURITY RULES AND REGULATIONS

Each of the Contractor's employees and vehicles will be required to have a pass or identification badge to enter the fenced area of the AEDC. Badges and passes shall be obtained at the Pass and Registration Building at the Main Gate, and will be issued free of charge. The Contractor shall return all passes and identification badges promptly to the Government upon termination of the services of any employee. The Contractor shall promptly report to the Government, the loss of passes and identification badges by any Contractor employee. The Contractor's employees shall abide by the security rules and identify all authorized Contractor vehicles. Identification may be by portable cards, decals, or markings.

CONTRACT CLAUSES
FIXED-PRICE CONSTRUCTION CONTRACT

52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. [Also, the full text of a clause may be accessed electronically at this/these address(es): **http://farsite.hill.af.mil/**

52.202-1	Definitions	MAY 2001
	Alternate I	APR 1984
52.203-3	Gratuities	APR 1984
52.203-5	Covenant Against Contingent Fees	APR 1984
52.203-7	Anti-Kickback Procedures	JUL 1995
52.203-8	Cancellation, Recission, and Recovery of Funds for Illegal or Improper Activity	JAN 1997
52.203-10	Price or Fee Adjustment for Illegal or Improper Activity	JAN 1997
52.203-12	Limitation on Payments to Influence Certain Federal Transactions	JUN 1997
52.204-4	Printing/Copying Double-Sided on Recycled Paper	AUG 2000
52.209-6	Protecting the Government's Interest when Subcontracting with Contractors Debarred, Suspended or Proposed for Debarment	JUL 1995
52.211-10	Commencement, Prosecution, and Completion of Work "Work must commence within 10 calendar days and be completed within 120 calendar days after receipt of notice to proceed."	APR 1984
52.211-12	Liquidated Damages - Construction Paragraph (a), insert $71.00 as the daily amount of liquidated damages.	SEP 2000
52.211-15	Defense Priority and Allocation Requirements	SEP 1990
52.219-8	Utilization of Small Business Concerns	OCT 2000
52.222-1	Notice to the Government of Labor Disputes	FEB 1997
52.222-3	Convict Labor	AUG 1996
52.222-4	Contract Work Hours and Safety Standards Act—Overtime Compensation	SEP 2000
52.222-6	Davis-Bacon Act	FEB 1995
52.222-7	Withholding of Funds	FEB 1988
52.222-8	Payrolls and Basic Records	FEB 1988
52.222-9	Apprentices and Trainees	FEB 1988
52.222-10	Compliance with Copeland Act Requirements	FEB 1988
52.222-11	Subcontracts (Labor Standards)	FEB 1988
52.222-12	Contract Termination - Debarment	FEB 1988
52.222-13	Compliance with Davis-Bacon and Related Act Regulation	FEB 1988
52.222-14	Disputes Concerning Labor Standards	FEB 1988
52.222-15	Certification of Eligibility	FEB 1988
52.222-21	Prohibition of Segregated Facilities	FEB 1999
52.222-26	Equal Opportunity	FEB 1999
52.222-27	Affirmative Action Compliance Requirements for Construction	FEB 1999
52.222-35	Affirmative Action for Disabled Veterans and Veterans of the Vietnam Era	APR 1998
52.222-36	Affirmative Actions for Workers with Disabilities	JUN 1998
52.222-37	Employment Reports on Disabled Veterans and Veterans of the Vietnam Era	JAN 1999
52.223-5	Pollution Prevention and Right-to-Know Information	APR 1998
52.223-6	Drug-Free Workplace	MAY 2001
52.223-14	Toxic Chemical Release Reporting	OCT 2000
52.225-13	Restrictions on Certain Foreign Purchases	JUL 2000
52.227-1	Authorization and Consent	JUL 1995
52.227-2	Notice and Assistance Regarding Patent and Copyright	AUG 1996

	Infringement	
52.227-4	Patent Indemnity - Construction Contracts	APR 1984
52.228-1	Bid Guarantee	SEP 1996
	"The amount of the bid guarantee shall be 20% of the bid price."	
52.228-2	Additional Bond Security	OCT 1997
52.228-5	Insurance - Work on a Government Installation	JAN 1997
52.228-11	Pledges of Assets	FEB 1992
52.228-12	Prospective Subcontractor Requests for Bonds	OCT 1995
52.228-14	Irrevocable Letter of Credit	DEC 1999
52.228-15	Performance and Payment Bonds—Construction	JUL 2000
52.229-3	Federal, State, and Local Taxes	JAN 1991
52.229-5	Taxes - Contracts Performed in U.S. Possessions or Puerto Rico	APR 1984
52.232-5	Payments Under Fixed-Price Construction Contracts	MAY 1997
52.232-17	Interest	JUN 1996
52.232-23	Assignment of Claims	JAN 1986
	Alternate I	APR 1984
52.232-27	Prompt Payment for Construction Contracts	MAY 2001
52.232-33	Mandatory Information for Electronic Funds Transfer Payment	MAY 1999
53.233-1	Disputes	DEC 1998
52.233-3	Protest After Award	AUG 1996
52.236-2	Differing Site Conditions	APR 1984
52.236-3	Site Investigation and Conditions Affecting Work	APR 1984
52.236-5	Material and Workmanship	APR 1984
52.236-6	Superintendence by the Contractor	APR 1984
52.236-7	Permits and Responsibilities	NOV 1991
52.236-8	Other Contracts	APR 1984
52.236-9	Protection of Existing Vegetation, Structures, Equipment Utilities, and Improvements	APR 1984
52.236-10	Operations and Storage Areas	APR 1984
52.236-11	Use and Possession Prior to Completion	APR 1984
52.236-12	Cleaning Up	APR 1984
52.236-13	Accident Prevention	NOV 1991
52.236-14	Availability and Use of Utility Services	APR 1984
52.236-15	Schedules for Construction Contracts	APR 1984
52.236-17	Layout of Work	APR 1984
52.236-21	Specifications and Drawings for Construction	FEB 1997
52.236-26	Preconstruction Conference	FEB 1995
52.242-13	Bankruptcy	JUL 1995
52.242-14	Suspension of Work	APR 1984
52.243-4	Changes	AUG 1987
52.246-12	Inspection of Construction	AUG 1996
52.246-21	Warranty of Construction	MAR 1994
52.248-3	Value Engineering—Construction	FEB 2000
52.249-2	Termination for Convenience of the Government (Fixed-Price)	SEP 1996
	Alternate I	SEP 1996
52.249-10	Default (Fixed-Price Construction)	APR 1984

DEPARTMENT OF DEFENSE SUPPLEMENT TO FEDERAL ACQUISITION REGULATION CLAUSES
The following Department of Defense Supplement to the Federal Acquisition Regulation Clauses is hereby incorporated by reference:

252.203-7001	Special Prohibition on Employment	MAR 1999
252.204-7003	Control of Government Personnel Work Product	APR 1992
252.204-7004	Required Central Contractor Registration	MAR 2000
252-209-7000	Acquisitions from Subcontractors Subject to On-Site Inspection under the Intermediate-Range Nuclear Forces (INF) Treaty	NOV 1995
252.223-7001	Hazard Warning Labels	MAR 1998
252.223-7006	Prohibition on Storage and Disposal of Toxic and Hazardous Materials	APR 1993
252.225-7012	Preference for Certain Domestic Commodities	AUG 2000
252.225-7031	Secondary Arab Boycott of Israel	JUN 1992
252.227-7033	Rights in Shop Drawings	APR 1966
252.231-7000	Supplemental Cost Principles	DEC 1991
252.236-7000	Modification Proposals - Price Breakdown	DEC 1991
252.236-7001	Contract Drawings, Maps and Specifications Paragraph (a), a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer. Incorporate the following drawings as part of Specification No. 999109 dated 27 March 2001.	AUG 2000

Title	Drawing No.	Sheet Ref No.
Cover Sheet	PUT10069.CS1	CS1
Demolition Plan Facility No. 740	PUT10069.A1	A1
Roof Plan	PUT10069.A2	A2
Elevations Facility 740	PUT10069.A3	A3
Enlarged Plans, Sections & Details	PUT10069.A4	A4
Details	PUT10069.A5	A5
Lighting & Power Installation Plans Facility 740	PUT10069.E1	E1
Roof Fire Alarm Plan Facility 740	PUT10069.FP1	FP1
Mechanical Demolition Plan Facility 740	PUT10069.M1	M1
Mechanical Plans & Details Facility 740	PUT10069.M2	M2
Mechanical Schedules & Details Facility 740	PUT10069.M3	M3
Elevations, Section, Window Details FOR REFERENCE ONLY	390-71AA	30.A.A2.1
Floor Plans & Schedules FOR REFERENCE ONLY	390-71AA	30.A.A1.2
Roof Plans, Eave & Expansion Joints FOR REFERENCE ONLY	390-71AA	30.A.A3.1
Wall Sections FOR REFERENCE ONLY	390-71AA	30.A.A4.2
Roof Plan & Details FOR REFERENCE ONLY		513-A3.2
South, West, North & East Elevations FOR REFERENCE ONLY		513-A4.5
Roof Framing Plan-Beam, Girder & Slab Schedules FOR REF. ONLY		513-S233.1

252.242-7000	Postaward Conference	DEC 1991
252.242-7004	Material Management and Accounting System	DEC 2000
252.243-7001	Pricing of Contract Modifications	DEC 1991

AIR FORCE SUPPLEMENT TO FEDERAL ACQUISITION REGULATION CLAUSES
The following Air Force Supplement to the Federal Acquisition Regulation Clauses are hereby incorporated by reference:

5352.223-9000 Elimination of Use of Class I Ozone Depleting Substances (ODS) in Air Force Procurements MAY 1996

The following Federal Acquisition Regulation clauses are hereby incorporated in full text:

52.225-9 -- Buy American Act - Balance of Payments Program Construction Materials (Feb 2000)

(a) *Definitions.* As used in this clause--

"Component" means any article, material, or supply incorporated directly into construction materials.

"Construction material" means an article, material, or supply brought to the construction site by the Contractor or a subcontractor for incorporation into the building or work. The term also includes an item brought to the site preassembled from articles, materials, or supplies. However, emergency life safety systems, such as emergency lighting, fire alarm, and audio evacuation systems, that are discrete systems incorporated into a public building or work and that are produced as complete systems, are evaluated as a single and distinct construction material regardless of when or how the individual parts or components of those systems are delivered to the construction site. Materials purchased directly by the Government are supplies, not construction material.

"Cost of components" means--

(1) For components purchased by the Contractor, the acquisition cost, including transportation costs to the place of incorporation into the end product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued); or

(2) For components manufactured by the Contractor, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1) of this definition, plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the end product.

"Domestic construction material" means--

(1) An unmanufactured construction material mined or produced in the United States; or

(2) A construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind for which nonavailability determinations have been made are treated as domestic.

"Foreign construction material" means a construction material other than a domestic construction material.

"United States" means the 50 States and the District of Columbia, U.S. territories and possessions, Puerto Rico, the Northern Mariana Islands, and any other place subject to U.S. jurisdiction, but does not include leased bases.

(b) *Domestic preference.*

(1) This clause implements the Buy American Act (41 U.S.C. 10a-10d) and the Balance of Payments Program by providing a preference for domestic construction material. The Contractor shall use only domestic construction material in performing this contract, except as provided in paragraphs (b)(2) and (b)(3) of this clause.

(2) This requirement does not apply to the construction material or components listed by the Government as follows: _____ [*Contracting Officer to list applicable excepted materials or indicate ``none''*]

(3) The Contracting Officer may add other foreign construction material to the list in paragraph (b)(2) of this clause if the Government determines that

(i) The cost of domestic construction material would be unreasonable. The cost of a particular domestic construction material subject to the requirements of the Buy American Act is unreasonable when the cost of such material exceeds the cost of foreign material by more than 6 percent. For determination of unreasonable cost under the Balance of Payments Program, the Contracting Officer will use a factor of 50 percent;

(ii) The application of the restriction of the Buy American Act or Balance of Payments Program to a particular construction material would be impracticable or inconsistent with the public interest; or

(iii) The construction material is not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality.

(c) Request for determination of inapplicability of the Buy American Act or Balance of Payments Program.

(1)

(i) Any Contractor request to use foreign construction material in accordance with paragraph (b)(3) of this clause shall include adequate information for Government evaluation of the request, including--

(A) A description of the foreign and domestic construction materials;

(B) Unit of measure;
(C) Quantity;
(D) Price;
(E) Time of delivery or availability;
(F) Location of the construction project;
(G) Name and address of the proposed supplier; and
(H) A detailed justification of the reason for use of foreign construction materials cited in accordance with paragraph (b)(3) of this clause.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed price comparison table in the format in paragraph (d) of this clause.

(iii) The price of construction material shall include all delivery costs to the construction site and any applicable duty (whether or not a duty-free certificate may be issued).

(iv) Any Contractor request for a determination submitted after contract award shall explain why the Contractor could not reasonably foresee the need for such determination and could not have requested the determination before contract award. If the Contractor does not submit a satisfactory explanation, the Contracting Officer need not make a determination.

(4) If the Government determines after contract award that an exception to the Buy American Act or Balance of Payments Program applies and the Contracting Officer and the Contractor negotiate adequate consideration, the Contracting Officer will modify the contract to allow use of the foreign construction material. However, when the basis for the exception is the unreasonable price of a domestic construction material, adequate consideration is not less than the differential established in paragraph (b)(3)(i) of this clause.

(5) Unless the Government determines that an exception to the Buy American Act or Balance of Payments Program applies, use of foreign construction material is noncompliant with the Buy American Act or Balance of Payments Program.

(d) *Data*. To permit evaluation of requests under paragraph (c) of this clause based on unreasonable cost, the Contractor shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Construction Materials Price Comparison

Construction material description	Unit of measure	Quantity	Price (dollars) *
Item 1			
Foreign construction material			
Domestic construction material			
Item 2			
Foreign construction material			
Domestic construction material			

[*List name, address, telephone number, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.*]

[*Include other applicable supporting information.*]

[**Include all delivery costs to the construction site and any applicable duty (whether or not a duty-free entry certificate is issued).]*

52.236-4 PHYSICAL DATA (APR 1984)

Data and information furnished or referred to below is furnished for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusions drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations and surveys.

(b) Weather Conditions (AEDC)

(1) The location of the work is subject to atmospheric temperature ranging from minus 10 degrees F to plus 105 degrees F. The average annual rainfall is about 54 inches and the average annual snowfall is about 4 inches.

(2) Time Extensions for Unusually Severe Weather

a. Based on data from the National Oceanic and Atmospheric Agency (NOAA), the following number of adverse weather days can be anticipated at Arnold AFB, TN in the month indicated.

JAN	16	MAY	8	SEP	7
FEB	13	JUN	6	OCT	5
MAR	9	JUL	8	NOV	7
APR	7	AUG	5	DEC	13

b. From receipt of Notice to Proceed throughout the contract performance period, the Government Project Officer will record daily the actual number of adverse weather days which prevent work for at least 50 percent of the contractor's workday.

c. Only after the cumulative number of "adverse weather days" as defined in b., above, has reached the total calculated from the monthly figures listed in a., above, or the proportionate number for partial calendar months in the performance period, will the Contracting Officer consider a time extension in accordance with the clause entitled "Default (Fixed-Price Construction)." A time extension will be granted on a day-for-day basis if the Contracting Officer determines that additional adverse weather days prevent work for at least 50 percent of the contractor's workday and delay work critical to the timely completion of the contract.

d. The contractor's schedule must reflect the delays associated with the anticipated adverse weather days listed in a., above. The Contracting Officer will grant no time extensions for adverse weather days within the cumulative total of the monthly numbers listed.

(c) Transportation Facilities to AEDC Fenced Area

(1) Highways. U.S. Highway 41A is a paved road passing through Tullahoma, Tennessee. U.S. Highway 41 and Interstate 24 are paved roads passing through Manchester, Tennessee. State Highway 55 is a paved road connecting U.S. Highway 41 and 41A at Manchester and Tullahoma, respectively.

Access to the AEDC area can be gained from State Highway 55 near Tullahoma via new paved highway intersecting U.S. Highway 41, 5.5 miles southwest of Manchester and 3.8 miles from the area entrance, and Interstate 24, 3.5 miles southeast of Manchester and 2.5 miles from the area entrance. Concrete pavements have been constructed within the AEDC area and may be used subject to the restrictions set forth herein. Access to the sites of work from the paved areas and other routes shall be provided and maintained by and at the expense of the Contractor. The route for equipment which is not permitted to operate on the concrete pavement shall be as approved by the Contracting Officer. No construction truck or trailer vehicles shall be operated upon pavements of the AEDC area except within the following load limitations.

(d) Travel Within the AEDC Area

(1) Streets and Roadways. Streets have been constructed within the AEDC area and may only be used subject to the restrictions set forth herein.

a. A "Special Permit" is required for the movement of all construction equipment, unless hereinafter provided otherwise, which is to be moved over streets or over areas containing underground ducting, piping, or overhead utilities. Application for the Special permit to move heavy equipment will be submitted to the Contracting Officer. Application for such movements will be made sufficiently in advance of the time needed to avoid delays in movement. Only wheel or tire vehicles which fall under the following maximum allowable load limitations may operate without permit upon AEDC streets:

DESIGN AXLE AND WHEEL LOADS ON STREETS

	Maximum Allowable Loads in Pounds			
	*Truck or Trailer		**Large Tire	Equipment
Streets	Per Axle	Per Wheel	Per Axle	Per Wheel
Avenues A, B, and C and 2nd Street 18,000	9,000	25,200	12,600	
Avenue E	24,000	12,000	33,600	16,800

1st, 4th, and 5th Streets	24,000	12,000	36,600	16,800
3rd Street between Avenues B and C	18,000	9,000	25,200	12,600
3rd Street between C and E	24,000	12,000	33,600	16,000

*Axles must be spaced greater than 40" apart.
**Equipment with tires wider than 16", such as large earth moving equipment.
These restrictions permit the operation of fully loaded DW-10's with No. 10 scrapers only on pavements with a maximum allowable load of 33,600 pounds. The axle load for large tire equipment shall be based upon the manufacturer's specified weights for fully loaded equipment.

b. If any equipment exceeds the above load limitations, or any track vehicles are used, the pavement must be protected with earth or fiber at the expense of the Contractor. Compliance with the above requirements does not preclude the Contractor's liability for any damage which results from his travel over AEDC streets.

(2) Other Routes. Routes for use of equipment which is not permitted on AEDC streets shall be as shown on the drawings, or as approved by the Contracting Officer. Access to the sites of work from the paved areas, and other routes, shall be provided and maintained by and at the expense of the Contractor.

(3) Traffic Regulations. The Contractor shall be cognizant of and comply with all AEDC traffic regulations as published and enforced on the AEDC Installation.

The following Department of Defense Supplement to the Federal Acquisition Regulation clauses is hereby incorporated in full text:

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) *Definitions.*

As used in this clause—

(1) "Components" means articles, materials and supplies incorporated directly into end products at any level of manufacture, fabrication or assembly by the Contractor or any subcontractor.

(2) "Department of Defense" (DoD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.

(3) "Foreign flag vessel" means any vessel that is not a U.S. flag vessel.

(4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through international waters.

(5) "Subcontractor" means a supplier, materialman, distributor or vendor at any level below the prime contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract. However, effective May 1, 1996, the term does not include a supplier, materialman, distributor, or vendor of commercial items or commercial components.

(6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.

(i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.

(ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.

(7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.

(b) The Contractor shall employ U.S.-flag vessels in the transportation by sea of any supplies to be furnished in the performance of this contract. The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that—

(1) U.S.-flag vessels are not available for timely shipment;

(2) The freight charges are inordinately excessive or unreasonable; or

(3) Freight charges are higher than charges to private persons for transportation of like goods.

(c) The Contractor must submit any request for use of other than U.S.-flag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum—

(1) Type, weight, and cube of cargo;
(2) Required shipping date;
(3) Special handling and discharge requirements;
(4) Loading and discharge points;
(5) Name of shipper and consignee;
(6) Prime contract number; and
(7) A documented description of efforts made to secure U.S.-flag vessels,
two U.S.-flag carriers contacted. Copies of telephone notes, telegraphic and facsimile messages or letters will be sufficient for this purpose.

(d) The contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Division of National Cargo, Office of Market Development, Maritime Administration, U.S. Department of Transportation, Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information—

(1) Prime contract number;
(2) Name of vessel;
(3) Vessel flag of registry;
(4) Date of loading;
(5) Port of loading;
(6) Port of final discharge;
(7) Description of commodity;
(8) Gross weight in pounds and cubic feet if available;
(9) Total ocean freight in U. S. dollars; and
(10) Name of the steamship company.

(e) The Contractor agrees to provide with its final invoice under this contract a representation that to the best of its knowledge and belief—

(1) No ocean transportation was used in the performance of this contract;

(2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;

(3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or

(4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format:

ITEM DESCRIPTION	CONTRACT LINE ITEMS	TOTAL QUANTITY

(f) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.

(g) The Contractor shall include this clause, including this paragraph (g) in all subcontracts under this contract, which exceed the simplified acquisition threshold in Part 13 of the Federal Acquisition Regulation.

The following clause applies only if a negative response is made to the inquiry in DFARS 252.247-7022:

252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) The Contractor has indicated by the response to the solicitation provision, 252.247-7022, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor—

(1) Shall notify the Contracting Officer of that fact; and
(2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.

(b) The Contractor shall include this clause, including this paragraph (b), revised as necessary to reflect the relationship of the contracting parties, in all subcontracts hereunder, except (effective May 1, 1996) subcontracts for the acquisition of commercial items or components.

The following Air Force Materiel Command Supplement to the Federal Acquisition Regulation clauses are hereby incorporated in full text:

5352.223-9000 USE OF HAZARDOUS MATERIALS IN THE PERFORMANCE OF ON-BASE CONTRACTS (AFMC) (JUL 1997)

(a) "Hazardous Material" as used in this clause includes any material defined as hazardous under the latest version of Federal Standard No. 313 (including revisions adopted during the term of the contract).

(b) The list of hazardous materials identified in FAR 52.223-3, Hazardous Material Identification and Material Safety Data, and DFARS 252.223-7001, Hazard Warning Labels, shall be updated during performance of the contract whenever the contractor determines that any other material to be delivered or used on base in excess of 24 hours and/or a 55 gallons of material under this contract is hazardous based on changes in the composition of the item(s) or a revision to Federal Standard No. 313. Provide written notification of changes in the Material Safety Data Sheets (MSDSs), including a copy of the updated MSDS, of each item to the identified point of contact on the installation prior to use of the item on installation.

(c) The contractor shall submit a Contractor Hazardous Material Report, GC-1642, available from Arnold Air Force Base, your contractor monitor, Ric Branch, at (931) 454-7044 for each item identified under Section I clauses referenced above or updates resulting from paragraph (b) of this clause 15 days prior to bringing the items on base. Update the report at least monthly (beginning no later than 30 days after the material is brought on base) until the hazardous material is removed from the base.

(d) All hazardous material used on base (including material to be used for a period of less than 24 hours) shall contain a hazardous material warning label. The label shall include a list of the hazardous chemical(s), material identification which matches the part number and/or trade name on the MSDS, appropriate hazard warnings (including description of target organs), and name and address of the chemical manufacturer, importer, or other responsible party.

(e) The contractor is responsible for conducting and documenting employee hazard communication training prior to the commencement of work on base.

(f) Neither the requirements of this clause nor any act or failure to act by the Government shall relieve the Contractor of any responsibility or liability for the safety of Government, contractor, or subcontractor personnel or property.

(g) Nothing contained in this clause shall relieve the contractor from complying with applicable Federal, State, and local laws, codes, ordinance, and regulations (including the obtaining of licenses and permits in conjunction with hazardous material).

(h) Notwithstanding any other rights in technical data specified elsewhere in this contract, the Government may use, duplicate, and disclose any data to which this clause is applicable to apprise personnel of the hazards to which they may be exposed and obtain medical treatment for those affected by the material. In addition, the Government may allow others to use, duplicate, and disclose data for these purposes.

5352.228-9001 INSURANCE CLAUSE IMPLEMENTATION (AFMC) (JUL 1997)

The contractor shall obtain and maintain the minimum kinds and amounts of insurance during performance of this contract as specified by FAR 28.307-2, Liability, and contemplated by FAR 52.228-5, Insurance—Work on a Government Installation, and/or 52.228-7, Insurance—Liability to Third Persons.

5352.236-9001 PREPARATION OF MATERIAL APPROVAL SUBMITTALS (AFMC) (JUL 1997)

The submittals contemplated by FAR 52.236-5, Materials and Workmanship, shall be accomplished on and in accordance with instructions pertaining to AF Form 3000, Material Approval Submittal.

5352.236-9002 PROGRESS SCHEDULES AND REPORTS (AFMC) (JUL 1997)

The reports contemplated in the clause FAR 52.236-15, Schedules for Construction Contracts, shall be accomplished and in accordance with the instructions for AF Form 3064, Contract Progress Schedule, and AF Form 3065, Contract Progress Report.

SOLICITATION PROVISIONS - FIXED-PRICE CONSTRUCTION CONTRACT

The following provisions of the Federal Acquisition Regulation (FAR) are hereby incorporated in full text. The numbers preceding the provision title and date correspond to the numbers set forth in Subsection 52.2 of the FAR.

52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)

(a) The offeror certifies that—

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in case of a sealed bid solicitation) or contract award (in case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory—

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated, and will not participate in any action contrary to subparagraphs (a) (1) through (a) (3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principles in certifying that those principles have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above

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[insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization];

(ii) As an authorized agent, does certify that the principles named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of this disclosure.

the term "bona fide employee," see Subpart 3.4 of the Federal Acquisition Regulation.]

(1) [ ] has, [ ] has not employed or retained any person or company to solicit or obtain this contract; and

(2) [ ] has, [ ] has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) *Definitions.*

"Common parent," as used in this solicitation provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

"Taxpayer Identification Number (TIN)," as used in this provision, means the number required by the Internal Revenue Service (IRS) to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325(d), reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M and implementing regulations issued by the IRS. If the resulting contract is subject to the reporting requirements described in Federal Acquisition Regulation (FAR) 4.904, the failure or refusal by the offeror to furnish the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the government (31 U.S.C. 7701(c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) *Taxpayer Identification Number (TIN).*

( ) TIN:_____.
( ) TIN has been applied for.
( ) TIN is not required because:
( ) Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the United States and does not have an office or place of business or a fiscal paying agent in the United States;
( ) Offeror is an agency or instrumentality of a foreign government;
( ) Offeror is an agency or instrumentality of a Federal Government;
( ) Other. State basis ._____

(e) *Type of organization.*

( ) Sole proprietorship;
( ) Partnership;
( ) Corporate entity (not tax-exempt):
( ) Corporate entity (tax-exempt):
( ) Government entity (Federal, State, or local);
( ) Foreign government;
( ) International organization per 26 CFR 1.6049-4;
( ) Other _____.

(f) *Common Parent.*

( ) Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this provision.
( ) Name and TIN of common parent:
Name_____
TIN_____

52.209-5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS (APR 2000)

a)

(1) The Offeror certifies, to the best of its knowledge and belief, that --

(i) The Offeror and/or any of its Principals –

(A) Are ( ) are not ( ) presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have ( ) have not ( ), within the three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property;

(C) Are ( ) are not ( ) presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision; and

(D) Have ( ) have not ( ) within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for : commission of fraud or a criminal offense in

conjunction with obtaining, attempting to obtain, or performing a public (Federal, state or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion or receiving stolen property; and (E) Are ( ) are not ( ) presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(D) of this provision.

(ii)

(A) The offeror, aside from the offenses enumerated in paragraphs (a)(1)(i)(A), (B), and (C) of this provision, has ( ) has not ( ) within the past three-years, relative to tax, labor and employment, environmental, antitrust, or consumer protection laws-

(1) Been convicted of a Federal or State felony (or has any Federal or State felony indictments currently pending against them); or

(2) Had a Federal court judgment in a civil case brought by the United States rendered against them; or

(3) Had an adverse decision by a Federal administrative law judge, board, or commission indicating a willful violation of law.

(B) If the offeror has responded affirmatively, the offeror shall provide additional information if requested by the Contracting Officer; and

(iii)

The Offeror has ( ) has not ( ), within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) *"Principals,"* for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) (DEC 1999)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained -

(a) From the ASSIST database via the Internet at http://assist.daps.mil; or

(b) By submitting a request to the --

Department of Defense Single Stock Point (DoDSSP)
Building 4, Section D
700 Robbins Avenue
Philadelphia, PA 19111-5094

Telephone (215) 697-2667/2179
Facsimile (215) 697-1462.

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a firm-fixed price contract resulting from this solicitation.

52.219-1 SMALL BUSINESS PROGRAM REPRESENTATIONS (MAY 1999)

a) (1) The North American Industry Classification System (NAICS) code for this acquisition is 235610 .

(2) The small business size standard is $17 million average annual receipts for the preceding 3 years.

(2) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) *Representations.*
(1) The offeror represents as part of its offer that it [ ] is, [ ] is not a small business concern.
(2) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents, for general statistical purposes, that it ( ) is, ( ) is not, a small disadvantaged business concern as defined in 13 CFR 124.1002.
(3) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offeror represents as part of its offer that it [ ] is, [ ] is not a women-owned small business concern.
(4) (Complete only if the offeror represented itself as a small business concern in paragraph (b)(1) of this provision.) The offferor represents as part of its offer that it [ ] is, [ ] is not a veteran-owned small business concern.
(3) (Complete only if the offeror represented itself as a veteran-owned small business concern in paragraph (b)(4) of this provision.) The offeror represents as part of its offer that is [ ] is, [ ] is not a service-disabled veteran-owned small business concern.

(c) *Definitions.* As used in this provision--
"Service-disabled veteran-owned small business concern"-
(1) Means a small business concern-
(i) Not less than 51 percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more service-disabled veterans; and
(ii) The management and daily business operations of which are controlled by one or more service-disabled veterans or, in the case of a veteran with permanent and severe disability, the spouse or permanent caregiver of such veteran.
(2) Service-disabled veteran means a veteran, as defined in 38 U.S.C. 101(2), with a disability that is service-connected, as defined in 38 U.S.C. 101(16).
"Small business concern," means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria in 13 CFR Part 121 and the size standard in paragraph (a) of this provision.
"Veteran-owned small business concern" means a small business concern-
(1) Not less than 51 percent of which is owned by one or more veterans (as defined at 38 U.S.C. 101(2)) or, in the case of any publicly owned business, not less than 51 percent of the stock of which is owned by one or more veterans; and
(2) The management and daily business operations of which are controlled by one or more veterans.
"Women-owned small business concern," means a small business concern --
(1) That is at least 51 percent owned by one or more women; or, in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more women; and
(2) Whose management and daily business operations are controlled by one or more women.

(d) *Notice*.

(1) If this solicitation is for supplies and has been set aside, in whole or in part, for small business concerns, then the clause in this solicitation providing notice of the set-aside contains restrictions on the source of the end items to be furnished.

(2) Under 15 U.S.C. 645(d), any person who misrepresents a firm's status as a small, HUBZone small, small disadvantaged, or women-owned small business concern in order to obtain a contract to be awarded under the preference programs established pursuant to section 8(a), 8(d), 9, or 15 of the Small Business Act or any other provision of Federal law that specifically references section 8(d) for a definition of program eligibility, shall --

(i) Be punished by imposition of fine, imprisonment, or both;

(ii) Be subject to administrative remedies, including suspension and debarment; and

(ii) Be ineligible for participation in programs conducted under the authority of the Act.

Alternate I (Oct 2000). As prescribed in 19.307(a)(2), add the following paragraph (b)(6) to the basic provision:

(6) [*Complete only if offeror represented itself as small business concern in paragraph (b)(1) of this provision*]. The offeror represents, as part of its offer, that--

(i) It ___is, ___is not a HUBZone small business concern listed, on the date of this representation, on the List of Qualified HUBZone Small Business Concerns maintained by the Small Business Administration, and no material change in ownership and control, principal office, or HUBZone employee percentage has occurred since it was certified by the Small Business Administration in accordance with 13 CFR Part 126; and

(ii) It ___is, ___is not a joint venture that complies with the requirements of 13 CFR Part 126, and the representation in paragraph (b)(6)(i) of this provision is accurate for the HUBZone small business concern or concerns that are participating in the joint venture. [*The offeror shall enter the name or names of the HUBZone small business concern or concerns that are participating in the joint venture:* _____.] Each HUBZone small business concern participating in the joint venture shall submit a separate signed copy of the HUBZone representation.

Alternate II (Oct 2000). As prescribed in 19.307(a)(3), add the following paragraph (b)(7) to the basic provision:

(7) [*Complete if offeror represented itself as disadvantaged in paragraph (b)(2) of this provision.*] The offeror shall check the category in which its ownership falls:

___ Black American.

___ Hispanic American.

___ Native American (American Indians, Eskimos, Aleuts, or Native Hawaiians).

___ Asian-Pacific American (persons with origins from Burma, Thailand, Malaysia, Indonesia, Singapore, Brunei, Japan, China, Taiwan, Laos, Cambodia (Kampuchea), Vietnam, Korea, The Philippines, U.S. Trust Territory of the Pacific Islands (Republic of Palau), Republic of the Marshall Islands, Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, Guam, Samoa, Macao, Hong Kong, Fiji, Tonga, Kiribati, Tuvalu, or Nauru).

___ Subcontinent Asian (Asian-Indian) American (persons with origins from India, Pakistan, Bangladesh, Sri Lanka, Bhutan, the Maldives Islands, or Nepal).

___ Individual/concern, other than one of the preceding.

52.219-19 SMALL BUSINESS CONCERN REPRESENTATION FOR THE SMALL BUSINESS COMPETITIVENESS DEMONSTRATION PROGRAM (JAN 1997)

(a) *Definition.*

"Emerging small business" as used in this solicitation, means a small business concern whose size is no greater than 50 percent of the numerical size standard applicable to the North American Industry Classification System (NAICS) code assigned to a contracting opportunity.

(b) (Complete only if the Offeror has represented itself under the provision at 52.219-1 as a small business concern under the size standards of this solicitation.)

The Offeror [ ] is, [ ] is not an emerging small business.

(c) (Complete only if the Offeror is a small business or an emerging small business, indicating its size range.)

Offeror's number of employees for the past 12 months (check this column if size standard stated in solicitation is expressed in terms of number of employees) or Offeror's average annual gross revenue for the last 3 fiscal years (check this column if size standard stated in solicitation is expressed in terms of annual receipts). (Check one of the following.)

No. of Employees	Avg. Annual Gross Revenues
_____50 or fewer	_____$1 million or less
_____51 - 100	_____$1,000,001 - $2 million
_____101 - 250	_____$2,000,001 - $3.5 million
_____251 - 500	_____$3,500,001 - $5 million
_____501 - 750	_____$5,000,001 - $10 million
_____751 - 1,000	_____$10,000,001 - $17 million
_____Over 1,000	_____Over $17 million

52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (FEB 1999)

The offeror represents that --
(a) It [ ] has, [ ] has not participated in a previous contract or subcontract subject to the Equal Opportunity clause of this solicitation;
(b) It [ ] has, [ ] has not filed all required compliance reports; and
(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

52.225-10 - NOTICE OF BUY AMERICAN ACT/BALANCE OF PAYMENTS PROGRAM REQUIREMENT-CONSTRUCTION MATERIALS (FEB 2000)

a) *Definitions.* "Construction material," "domestic construction material," and "foreign construction material," as used in this provision, are defined in the clause of this solicitation entitled ``Buy American Act--Balance of Payments Program--Construction Materials" (Federal Acquisition Regulation (FAR) clause 52.225-9).
(b) Requests for determinations of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of the clause at FAR 52.225-9 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.
(c) Evaluation of offers.

(1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act or Balance of Payments Program, based on claimed unreasonable cost of domestic construction material, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(3)(i) of the clause at FAR 52.225-9.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers.

(1) When an offer includes foreign construction material not listed by the Government in this solicitation in paragraph (b)(2) of the clause at FAR 52.225-9, the offeror also may submit an alternate offer based on use of equivalent domestic construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of the clause at FAR 52.225-9 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of the clause at FAR 52.225-9 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic construction material, and the offeror shall be required to furnish such domestic

construction material. An offer based on use of the foreign construction material for which an exception was requested-

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or
(ii) May be accepted if revised during negotiations.

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO) shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from AEDC/PKP, 100 Kindel Drive, Suite A332, Arnold Air Force Base, Tennessee 37389-1332.

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

2.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This solicitation incorporates one or more solicitation provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. [The offeror is cautioned that the listed provisions may include blocks that must be completed by he offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at this/these address(es): **http://farsite.hill.af.mil/**

52.203-11	Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions	APR 1991
52.204-5	Women-Owned Business	MAY 1999
52.211-14	Notice of Priority Rating for National Defense Use "Any contract awarded will be a C20 rated order"	SEP 1990
52.214-1	Solicitation Definitions—Sealed Bidding	JUL 1987
52.214-3	Amendments to Invitations for Bid	DEC 1989
52.214-4	False Statements in Bids	APR 1984
52.214-5	Submission of Bids	MAR 1997
52.214-6	Explanation to Prospective Bidders	APR 1984
52.214-7	Late Submissions, Modifications, and Withdrawals of Bids	NOV 1999
52.214-18	Preparation of Bids - Construction	APR 1984
52.214-19	Contract Award - Sealed Bidding - Construction	AUG 1996
52.222-23	Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity The Goal for minority participation is 12.0 percent and for female participation is 6.9 percent for each trade. Contract will be performed in Tennessee, Coffee County, Arnold AFB.	FEB 1999
52.236-27	Site Visit (Construction) Insert the following as the name, address, and telephone number of the individual who may be contacted to arrange a site visit: Mr. Eric S. Yatsko AEDC/PKP 100 Kindel Drive, Suite A332 Arnold AFB TN 37389-1332 (931) 454-4347	FEB 1995

DEPARTMENT OF DEFENSE SUPPLEMENT TO FEDERAL ACQUISITION REGULATION PROVISIONS
The following provision of the Department of Defense Supplement to the Federal Acquisition Regulation (48 CFR Chapter 2) Provisions is hereby incorporated by reference:

252.204-7001	Commercial and Government Entity (CAGE) Code Reporting	AUG 1999

The following provisions of the Department of Defense Supplement to the Federal Acquisition Regulation (48 CFR Chapter 2) are hereby incorporated in full text:

252.209-7001 DISCLOSURE OF OWNERSHIP OR CONTROL BY THE GOVERNMENT OF A TERRORIST COUNTRY (MAR 1998)

(a) *Definitions.* As used in this provision-

(1) "Government of a terrorist country" includes the state and the government of a terrorist country, as well as any political subdivision, agency, or instrumentality thereof.

(2) "Terrorist country" means a country determined by the Secretary of State, under section 6(j)(1)(A) of the Export Administration Act of 1979 (50 U.S.C. App. 2405(j)(i)(A)), to be a country the government of which has repeatedly provided support for acts of international terrorism. As of the date of this provision, terrorist countries include: Cuba, Iran, Iraq, Libya, North Korea, Sudan, and Syria.

(3) "Significant interest" means-

(i) Ownership of or beneficial interest in 5 percent or more of the firm's or subsidiary's securities. Beneficial interest includes holding 5 percent or more of any class of the firm's securities in "nominee shares," "street names," or some other method of holding securities that does not disclose the beneficial owner;

(ii) Holding a management position in the firm, such as a director or officer;

(iii) Ability to control or influence the election, appointment, or tenure of directors or officers in the firm;

(iv) Ownership of 10 percent or more of the assets of a firm such as equipment, buildings, real estate, or other tangible assets of the firm; or

(v) Holding 50 percent or more of the indebtedness of a firm.

(b) *Prohibition on award.* In accordance with 10 U.S.C. 2327, no contract may be awarded to a firm or a subsidiary of a firm if the government of a terrorist country has a significant interest in the firm or subsidiary or, in the case of a subsidiary, the firm that owns the subsidiary, unless a waiver is granted by the Secretary of Defense.

(c) *Disclosure.* If the government of a terrorist country has a significant interest in the Offeror or a subsidiary of the Offeror, the Offeror shall disclose such interest in an attachment to its offer. If the Offeror is a subsidiary, it shall also disclose any significant interest the government of a terrorist country has in any firm that owns or controls the subsidiary. The disclosure shall include-

(1) Identification of each government holding a significant interest; and

(2) A description of the significant interest held by each government.

252.247-7022 REPRESENTATION OF EXTENT OF TRANSPORTATION BY SEA (AUG 1992)

(a) The Offeror shall indicate by checking the appropriate blank in paragraph (b) of this provision whether transportation of supplies by sea is anticipated under the resultant contract. The term "supplies" is defined in the Transportation of Supplies by Sea clause of this solicitation.

(b) *Representation.*

The Offeror represents that it—

____ Does anticipate that supplies will be transported by sea in the performance of any contract or subcontract resulting from this solicitation.

____ Does not anticipate that supplies will be transported by sea in the performance of any contract of subcontract resulting from this solicitation.

(c) Any contract resulting from this solicitation will include the Transportation of Supplies by Sea clause. if the Offeror represents that it will not use ocean transportation, the resulting contract will also include the Defense FAR Supplement clause at 252.247-7024, Notification of Transportation of Supplies by Sea.

The following provision of the Air Force Materiel Command Supplement to the Federal Acquisition Regulation are hereby incorporated in full text:

5352.236-9000 MAGNITUDE OF CONSTRUCTION PROJECTS (AFMC) (JUL 1997)

The estimated price range for this project is between $250,000 and $500,000.

General Decision Number TN010050

General Decision Number TN010050
Superseded General Decision No. TN000050
State: **Tennessee**
Construction Type:
BUILDING
County(ies):
COFFEE
BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)
Modification Number 0 Publication Date 03/02/2001

COUNTY(ies):
COFFEE

ELEV0093A 06/09/1998

	Rates	Fringes
ELEVATOR MECHANIC	19.86	6.405+a

Footnote:
a. Employer contributes 8% basic hourly rate for 5 years service and 6% basic hourly rate for 6 months to 5 years service as Vacation pay credit. Seven Paid Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day.

SUTN1046A 03/24/1994

	Rates	Fringes
CARPENTERS (includes formwork) (excluding acoustical ceiling installation and dry-wall hanging)	10.68	
CARPENTERS (installing acoustical ceilings only)	11.61	
CEMENT MASONS	10.43	
DRYWALL FINISHERS	11.00	
DRYWALL HANGERS	10.26	
GLAZIERS	9.70	.18
LABORERS, Unskilled	6.72	
PAINTERS, Brush (excluding drywall finishing)	9.17	
PIPEFITTERS (HVAC work only)	12.74	.86
PLUMBERS (excluding HVAC work)	10.21	
ROOFERS	10.68	
SHEET METAL WORKERS (excluding HVAC duct work)	9.24	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29 CFR 5.5(a)(1)(v)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

00591

SPEC NO 999109
27 March 2001

GENERAL SPECIFICATION

FOR

REPLACE ROOF PWT OFFICE BUILDING 740

ARNOLD ENGINEERING DEVELOPMENT CENTER

ARNOLD AIR FORCE BASE, TENNESSEE 37389-9998

INDEX

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY. Work consists of removing the existing built-up roof system. Prepare the roof surface for the new work. Provide the interim roof system for protection against the weather. Provide a new structural system for the new standing seam roof system on Building 740 identified on Drawings PUT10069. Provide a complete standing seam roof assembly in accordance with Factory Mutual requirements for Class 1A fire-hazard resistance and Class 1-90 windstorm resistance. The work includes removal of existing asbestos and lead materials and placement in the AEDC lead or construction landfills, as applicable. The major items of work to be provided are given on the drawings and listed below:

A. Provide asbestos and lead removal for asbestos and lead-contaminated roof materials.

B. Remove and replace mechanical items such as roof plumbing vents and ventilation fans as indicated.

C. Remove existing roof materials including vapor barrier, insulation, built-up roof membrane, flashing, and edge nailer. Remove steel ladders. Patch with mortar colored to match the brick.

D. Modify existing roof drains, as stated on the mechanical demolition drawing.

E. Restore concrete surface to level, if needed, patch cracks, spalling and other defects which would affect the successful completion of the new roof. Consult the Government representative to determine extent of restoration once the old roof is removed. Consider this work to be approximately 20 percent of total roof area.

F. Provide new roof water seal: Two-ply 30# felt and hot asphaltic sealer, on concrete deck after removal of existing built-up roof, installation, flashing and perimeter nailer. This work to be done in stages: roof tear off, clean and restore concrete roof, provide interim waterproof membrane seal, provide new roof support system, and provide new standing seam roof.

G. Provide roof support system for standing seam metal roof.

H. Provide preformed standing-seam metal roof system with concealed fasteners, Kynar 500 finish, related flashing, counter flashing, roof accessories, and sealant as required.

I. Provide attic ventilation system, consisting of ridge vents and continuous vented soffits.

J. Provide blanket insulation with vinyl face to the warm space.

K. Provide access to the low and the high roofs with new walls and doors.

L. Provide access and staging areas composed of steel supports, metal deck, and light weight concrete floor.

M. Provide new steel double doors with steel frame, glazing, and hardware at each rear wall.

N. Provide adequate traffic ways in the attic to mechanical equipment.

O. Provide preformed metal gutters, downspouts, flat fascia panels, vented soffit panels and vent louvers with baked on factory finish, color Medium-Bronze. Submit color samples.

P. Provide splash blocks.

Q. Remove existing ladders to each roof.

R. Provide one new steel ladder with cage to the two-story building and one new steel ladder without cage to the one story building.

S. Provide mechanical demolition and modifications.

T. Provide electrical demolition and modifications.

U. Provide fire detection and alarm systems.

1.2 RECORD (AS-BUILT) DRAWINGS

A. Mark one full-sized copy of the drawings (red-line) to accurately show as-built conditions during the progress of the job. Show all changes, additions, and deviations from the original drawings. If no changes occur, furnish certification to that effect. Submit to the Contracting Officer for approval prior to applying for final payment.

1.3 DEFINITIONS

A. Certain terms used in the contract documents are defined below. Definitions and explanations contained in this section are not complete, but are general for the work to the extent that they are not stated more explicitly in another element of the contract documents.
   1. Furnish. The term "furnish" means to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations.
   2. Install. The term "install" describes operations at the project site, including the actual unloading, unpacking, assembly, erection, placing,

anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning, and similar operations.

3. Provide. The term "provide" means "provide complete in place"; that is, "furnish and install."
4. Indicated. Where "as indicated" or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise.

1.4 CODES AND STANDARDS

A. AEDC Safety Standard:

1. E18	Managing Wastes Containing Chemical or Petroleum Products, 1998.

The Government representative will furnish a copy of this Safety Standard to the contractor upon request.

B. Air Force Federal Acquisition Regulation (AFFARS):

1. 5352.223-9000	Elimination of Use of Class I Ozone Depleting Substances (ODS), May 1996.

C. Code of Federal Regulations (CFR):

1. 29 CFR 1926.1101	Asbestos, 2000.
2. 40 CFR 261	Identification and Listing of Hazardous Waste, 2000.
3. 40 CFR 370	EPA Hazardous Chemical Reporting and Community Right to Know Requirement, 2000.

1.5 JOB CONDITIONS

A. Plan and execute this project in a manner to minimize downtime. Furnish new components and devices, complete, with all necessary materials for installation to meet this objective. Schedule all work in advance with the Government representative.

B. Place all sanitary waste from lunches in local area dumpsters.

C. Prior to start of work contractor shall meet with AEDC Safety offices to develop a job safety analysis and safety plan for execution of the work.

1.6 ASBESTOS PRODUCTS

A. Do not use products or materials that contain asbestos on this project except as expressly authorized by the Contracting Officer. If no substitutes for asbestos products are available, and the Contracting Officer approves the use of asbestos products, highlight and detail their exact location on the drawings and identify their location in the field following 29 CFR 1926.1101 guidelines.

1.7 HAZARDOUS WASTE

A. Where hazardous waste (as identified in 40 CFR 261) is generated, follow the procedures in AEDC Safety Standard E18, Chemical and Petroleum Products Waste Management, for storing and turning in hazardous waste. These procedures include the requirement to complete Forms GC-565 and GC-1337, which will be furnished by the Government representative.

1.8 DISALLOWED PRODUCTS

A. Do not use products or materials that contain lead, chromium, mercury, cadmium, silver, barium, selenium, beryllium, or arsenic on this project except as expressly authorized by the Contracting Officer. If no substitutes for products containing the listed materials are available, and the Contracting Officer approves the use of products containing the listed materials, highlight and detail their exact location on the drawings.

1.9 ELIMINATION OF ODS CHEMICALS

A. The use of Class I ozone depleting substances (ODS) is prohibited. Reference text of AFFARS clause 5352.223-9000 (May 1996).

1.10 HAZARDOUS MATERIAL IDENTIFICATION AND MATERIAL SAFETY DATA

A. The following procedures shall be followed to meet 40 CFR 370, EPA Hazardous Chemical Reporting and Community Right to Know Requirement.
   1. Procedures:
      a. The contractor shall furnish information on the hazardous materials he brings on AEDC property prior to beginning on-site work. Hazardous materials may include solvents, paints, adhesives, acids, or any other substance which could be included within the definitions in paragraph 2.
      b. The information required is:
         1) Company name, point of contact, and phone number.
         2) Brief statement indicating how the hazardous material will be used within the scope of the contract.
         3) List of all hazardous materials to be used (product name, manufacturer’s name, and address).
         4) Amount of each material to be stored on site and where it will be stored.
         5) Where the product Material Safety Data Sheets (MSDS) will be maintained.
      c. All unused product is the responsibility of the contractor and shall be removed from AEDC property at the completion of the project.

d. The contractor shall coordinate with the Government representative and the Hazardous Waste Operations Group (454-3628) if any hazardous waste is to be generated.

2. Definitions
   a. Hazard communication standard. A chemical right-to-know law under OSHA that requires chemical manufacturers and importers to assess the hazards of chemicals they make or import and to distribute this information to inform workers of the hazards associated with these chemicals. This written information is a Material Safety Data Sheet (MSDS).
   b. Hazard classes. Hazardous materials that have been grouped into classes by the Department of Transportation (DOT). These classes include explosives, flammables, oxidizers and organic peroxides, compress gases, corrosives, and poisons.
   c. Hazardous material. Any substance that may be harmful when used. Specific substances have been designated as hazardous under the Clean Water Act, the Resource and Conservation and Recovery Act, and the hazardous air pollutants under the Clean Air Act.
   d. Hazardous waste. Any waste that may cause or significantly contribute to serious illness or death or that may pose a substantial threat to human health or the environment, if not properly managed. Hazardous wastes may be solids, liquids, semi-solids, or compressed gases.

END OF SECTION

SECTION 01060
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 This section lists regulations, codes, and standards which specify procedural and administrative requirements imposed upon the work.

1.2 The contractor shall comply with provisions of the following documents to the extent referenced herein.

A. Government documents:

1. AEDC Safety Standards*:

a.	A6	User and Subcontractor Safety, 1996.
b.	A9	Hazard Communications, 1996.
c.	B1	Work Clearances, 1998.
2.	B5	Confined Spaces, 1997.
3.	E7	Asbestos, 1997.
d.	E17	Oil and Hazardous Substances Spill Response, 1998.
e.	E18	Managing Waste Containing Chemical or Petroleum Products, 1998.
f.	E19	Lead and Heavy Metals, 1997.

* The Government representative will furnish a copy of these Safety Standards to the contractor upon request.

2. Air Force Federal Acquisition Regulation (AFFARS):

a.	5352.223-9000	Elimination of Use of Class I Ozone Depleting Substances (ODS), May 1996.

3. Code of Federal Regulations (CFR):

a.	29 CFR 1910.134	Respiratory Protection, 2000.
b.	29 CFR 1910.1200	Hazard Communication, 2000.
c.	29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists, 2000.
d.	29 CFR 1926.57	Ventilation, 2000.
e.	29 CFR 1926.59	Hazard Communication, 2000.
f.	29 CFR 1926.62	Lead Standard, 2000.
g.	29 CFR 1926.1101	Asbestos, 2000.
h.	40 CFR 82	Protection of Stratospheric Ozone, 2000.
i.	40 CFR 61	National Emission Standards for Hazardous Air Pollutants (NESHAP), 2000.
j.	40 CFR 260	Hazardous Waste Management Systems: General, 2000.
k.	40 CFR 261	Identification and Listing of Hazardous Wastes, 2000.

l.	40 CFR 262	Generators of Hazardous Waste, 2000.
m.	40 CFR 370	EPA Hazardous Chemical Reporting and Community Right to Know Requirement, 2000.
n.	49 CFR 172	Department of Transportation (DOT) Regulations for Use of Hazardous Materials Tables and for Communication, 2000.
o.	49 CFR 178	DOT Specifications for Packaging, 2000

4. Environmental Protection Agency (EPA) Document:

a.	SW-846	Proposed Sampling and Analytical Methodologies for Additions to Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 1984.

5. Public Law (PL):

a.	101-637	The Asbestos School Hazard Abatement Reauthorization Act (ASHARA), 1992.
b.	102-550 Title X	Section 1017 of the Residential Lead-Based Paint Hazard Reduction Act of 1992.

6. Tennessee Department of Environment and Conservation Standard:
   a. Chapter 1200-3-11-02 Hazardous Air Contaminants, Asbestos, 1998.

B. Non-Government documents:

1. American Architectural Manufacturers Association (AAMA) Standards:

a.	603.8-92	Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extrusions Aluminum.

2. American Bearing Manufacturers Association (ABMA) Standard:

a.	9-90	Load Ratings and Fatigue Life for Ball Bearings.

3. American Concrete Institute (ACI) Standard:

a.	COMP 27-00	Steel Fiber Reinforced Concrete.
b.	COMP 28-00	Synthetic and Other Non-Metallic Fiber Reinforcement of Concrete.
c.	301-99	Structural Concrete.
d.	302.1R-96	Guide for Concrete Floor and Slab Construction.
e.	308-97	Standard Practice for Curing Concrete.
f.	544.1R-96	Fiber Reinforced Concrete.
g.	544.2R-89	Measurement of Properties of Fiber Reinforced Concrete.

4. American Institute of Steel Construction (AISC) Standard:

a.	M018L-94	Manual of Steel Construction Load and Resistance Factor Design Structural Members, Specifications, and Codes.
b.	M010L-94	Manual of Steel Construction Load and Resistance Factor Design Volume II Connections.

5. Air Movement and Control Association (AMCA) Standard:

a.	99-86	Standards Handbook.

b.	210-85	Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
c.	301-90	Methods for Calculating Fan Sound Ratings from Laboratory Test Data.
d.	500-89	Test Methods for Louvers, Dampers, and Shutters.

6. American National Standards Institute (ANSI) Standards:

a.	Z9.2-91	Fundamentals Governing the Design and Operation of Local Exhaust Systems.
b.	Z88.2-92	Respiratory Protection.

7. American Society of Heating, Refrigeration and Air-Conditioning Engineer (ASHRAE) Standard:

a.	15-94	Safety Code for Mechanical Refrigeration.

8. American Society of Mechanical Engineers (ASME) Standard:

a.	A13.1-96	Scheme for the Identification of Piping Systems.
b.	B16.22-95	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
b.	B31.3-99	Process Piping.
c.	B31.9-96	Building Services Piping.

9. American Society for Testing and Materials (ASTM) Standards:

a.	A36-00	Carbon Structural Steel.
b.	A90-99	Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
c.	A123 REV A-99	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
d.	A185-97	Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
e.	A653-00	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
f.	A924-99	General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
g.	B8-99	Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
h.	B32-00	Solder Metal.
i.	B88-99	Seamless Copper Water Tube.
j.	B209-00	Aluminum and Aluminum-Alloy Sheet and Plate.
k.	B221-96	Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
l.	B280-99	Seamless Copper Tubes for Air Conditioning and Refrigeration Field Service.
m.	C94-00	Ready-Mixed Concrete.
n.	C150-99	Portland Cement.
o.	C177-97	Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

p.	C208-95	Cellulosic Fiber Insulating Board.
q.	C309-98	Liquid Membrane-Forming Compounds for Curing Concrete.
r.	C335-95	Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
s.	C404-97	Aggregates for Masonry Grout.
t.	C449-00	Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
u.	C518-98	Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
v.	C534-99	Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
w.	C547-00	Mineral Fiber Preformed Pipe Insulation.
x.	C612-00	Mineral Fiber Block and Board Thermal Insulation.
y.	C665-95	Mineral-Fiber Blanket Thermal Insulation for Light Frame
z.	C834-95	Latex Sealants.
aa.	C882-99	Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
bb.	C920-98	Elastomeric Joint Sealants.
cc.	C921-96	Properties of Jacketing Materials for Thermal Insulation.
dd.	C955-00	Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Applications of Gypsum Panel Products and Metal Plaster Bases.
ee.	D226-97	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
ff.	D638-99	Tensile Properties of Plastics.
gg.	D695-96	Compressive Properties of Rigid Plastics.
hh.	D790-99	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
ii.	D1056-00	Flexible Cellular Materials-Sponge or Expanded Rubber.
jj.	D2000-99	Rubber Products in Automotive Applications.
kk.	E84-00	Surface Burning Characteristics of Building Materials.
ll.	E96-00	Water Vapor Transmission of Materials.
mm.	E814-97	Fire Tests of Through-Penetration Fire Stops.

11. American Welding Society (AWS) Standard:

a.	A2.4-98	Symbols for Welding, Brazing and Nondestructive Examination.
b.	A5.8-92	Filler Metals for Brazing and Braze Welding.

c. D1.1-00 Structural Welding Code.
d. D1.3-98 Structural Welding Code - Sheet Steel.
e. Z49.1-99 Safety in Welding, cutting, and Allied Processes.

12. Builders hardware manufacturers Association (BHMA) Standards:
    a. A156 Complete Set of 24 BHMA Standards (A156 Series) with Binder.
    b. A156.1-97 Butts and Hinges.
    c. A156.4-92 Door Controls - Closures.
    d. A156.7-97 Template Hinge Dimensions.
    e. A156.13-94 Mortise Locks and Latches.
    f. A156.18-93 Materials and Finishes
13. Flat Glass Marketing Association (FGMA) Glazing Manual, 1990.
14. NACE International Standard:
    a. NO 5-95 Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating.
15. National Electrical Manufacturers' Association (NEMA) Standards:
    a. 250-97 Enclosures for Electrical Equipment (1000 Volt Maximum).
    b. ICS 6-93 Industrial Control and Systems Enclosures.
    c. WD 1-99 General Color Requirements for Wiring Devices.
    d. WD 6-97 Wiring Devices - Dimensional Specifications.
16. National Fire Protection Association (NFPA) Standard:
    a. 70-98 National Electrical Code (NEC).
    b. 72-99 National Fire Alarm Code.
    c. 90A-99 Installation of Air Conditioning and Ventilation System.
    d. 101-00 Life Safety Code.
17. Steel Deck Institute (SDI) Standard:
    a. Design Manual for Composite Decks, Form Decks, Roof Decks, Cellular Metal Floor Deck with Electrical Distribution, 1989.
18. Steel Door Institute (SDI) Standard:
    a. A250.8-98 Steel Doors and Frames.
19. Steel Structures Painting Council (SSPC) Standard:
    a. Guide 7-95 Guide for the Disposal of Lead-Contaminated Surface Preparation Debris.
    b. SP 5-99 White Metal Blast Cleaning.
    c. Paint 15-91 Steel Joist Shop Paint Type I, Red Oxide Paint Type II, Asphalt Coating.
    d. Paint 20-91 Zinc-rich Primers (Type I, "Inorganic," and Type II, "Organic").
20. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Standard:
    a. Architectural Sheet Metal Manual, 1993.
    b. HVAC Duct Construction Standards Metal and Flexible 1995.

21. Underwriters Laboratories, Inc. (UL) Standard:

a.	1-00	Flexible Metal Conduit.
b.	6-00	Rigid Metal Conduit.
c.	50-99	Enclosures for Electrical Equipment.
d.	98-98	Enclosed and Dead-Front Switches.
e.	181-98	Factory-Made Air Ducts and Connectors.
f.	360-97	Liquid-Tight Flexible Steel Conduit.
g.	498-99	Attachment Plugs and Receptacles.
h.	514A-99	Metallic Outlet Boxes.
i.	514B-98	Fittings for Cable and Conduit.
j.	586-99	Safety High-Efficiency, Particulate, Air Filter Units.
k.	797-00	Electrical Metallic Tubing.
l.	1581-98	Electrical Wires, Cables, and Flexible Cords.

C. Drawings:

1. PUT10069 Replace Roof PWT Office Building 740, 11 sheets.
2. Reference Drawings (provided)

TF-3 Sheet no. 513-A3.2	Sverdrup & Parcell.
TF3, Sheet no. 513-A4.5	Sverdrup & Parcell.
TF-3, Sheet no. 513-S233.1	Sverdrup & Parcell.
30-A-A2.1	Woolwine, Harwood & Clark.
30-A-A3.1	Woolwine, Harwood & Clark.
30-A-A4.2	Woolwine, Harwood & Clark.
30-A-52.1	Woolwine, Harwood & Clark.

END OF SECTION

SECTION 01340
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS. This section specifies procedural requirements for non-administrative submittals, including shop drawings, product data, samples, and other miscellaneous work-related submittals. These submittals are required to amplify, expand, and coordinate other information contained in the contract. Non-work-related submittals are addressed elsewhere in the contract rather than in the specification and may include items such as: contract progress schedule, permits, payment applications, performance and payment bonds, insurance certificates, and progress reports.

A. Shop drawings. These are technical drawings and data specially prepared for this project including fabrication and installation drawings, setting and seaming diagrams, and coordination drawings (for use on-site).

B. Product data. This data includes standard printed information on manufactured products that has not been specially prepared for this project, including manufacturers' product specifications and installation instructions, standard color charts, catalog cuts, standard wiring diagrams, and standard product operating and maintenance manuals.

C. Samples. These are physical examples of work, including, swatches showing color, texture, and pattern, color-range sets, and units of work to be used for independent inspection and testing.

D. Miscellaneous submittals. These are work-related, non-administrative submittals that do not fit in the three previous categories, including the following:
1. Maintenance agreements.
2. Survey data and reports.
3. Project photographs.
4. Record drawings (as-built drawings).
5. Field measurement data.
6. Operating and maintenance manuals.
7. Keys and other security protection devices.
8. Maintenance tools and spare parts.
9. Overrun or maintenance stock.
10. Qualification certificates.

1.2 SUBMITTAL PROCEDURES

A. Coordination. Coordinate the preparation and processing of submittals with the performance of the work. Coordinate each submittal with other

submittals and related activities, such as testing, purchasing, fabricating, and delivering, that require sequential activity.

B. Listing. At the end of this section is a summarized listing of the submittals required for the work. The listing is included for the convenience of users of the contract documents.

C. Transmittal timing. Prepare and transmit each submittal to the Contracting Officer sufficiently in advance of the scheduled performance of related work and other applicable activities. Transmit different kinds of submittals for the same unit of work so that processing will not be delayed by the Government's need to review submittals concurrently for coordination.

D. Review time. Allow sufficient time so that contract performance will not be delayed as a result of the time required to properly process submittals, including time for re-submittals, if necessary. Allow 10 working days for initial Government processing of each submittal. No extension of time will be authorized because of the contractor's failure to transmit submittals to the Government sufficiently in advance of the work.

E. "Approval" submittals. Submittals requiring approval by the Contracting Officer are so designated in the applicable sections and the submittal list at the end of this section. When brand names or equal are specified, any "equal" submitted will require approval. Any submittal requesting a deviation will require approval. Do not install any equipment or material requiring approval submittals until approvals are received from the Contracting Officer. The Government will status receipt or approval of all submittal requirements in the last two columns.

F. "Information only" submittals. Submittals not requiring the Contracting Officer's approval are considered to be "information only" submittals.

1.3 SPECIFIC SUBMITTAL REQUIREMENTS. Submittal requirements for individual units of work are specified in the applicable specification section. Except as otherwise indicated in the individual sections, comply with the following requirements for each type of submittal.

A. Shop drawings. Information required on shop drawings includes dimensions, identification of specific products and materials which are included in the work, compliance with specified standards, and notations of coordination requirements with other work. Provide special notations of dimensions that have been established by field measurements. Highlight, encircle, or otherwise indicate deviations from the contract documents on the shop drawings. Furnish one reproducible and four copies.

B. Product data. General information required specifically as product data includes manufacturers' standard printed recommendations for application and use, compliance with recognized standards of trade associations and testing agencies, the application of their labels and seals (if any), special notation of dimensions which have been verified by way of field measurement, and special coordination requirements for interfacing the material, product, or system with other work. Furnish four copies.

C. Samples. Submit samples for the Contracting Officer's visual review of general kind, color, pattern, and texture for a final check of the coordination of these characteristics with other related elements of the work and for quality control comparison of these characteristics between the final sample submittal and the actual work as it is delivered and installed.

D. Miscellaneous submittals. These submittals include the following:
1. Inspection and test reports. Furnish three copies of such reports.
2. Record drawings.
3. Operating and maintenance data. Furnish three bound copies of operating data and maintenance manuals.
4. Materials and tools. Refer to individual sections of the specification for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.
5. Certifications, reports, instructions, and lists. Furnish three copies of such submittals.

1.4 REQUIRED SUBMITTALS

No.	Section Reference	Submittal Description	App	Info	Approval Authority	Initial /Date
1	01010 para 1.2A	Record Drawings	X			
2	02080 para 1.3A	Employee Certification	X			
3	02080 para 1.3B	Training and Medical Certifications		X		
4	02080 para 1.3C	Training and Hazard Communications Certification	X			
5	02080 para 1.3D	Product List	X			
6	02080 para 1.3E	Equipment List	X			
7	02080 para 1.3F	Notice of Violation		X		
8	02080 para 1.3G	Environmental, Health, and Safety Plan	X			
9	02080 para 1.3H	Asbestos Removal Plan	X			
10	02080 para 1.3I	Air Sampling Reports		X		
11	02080 para 1.3J	Testing Certifications	X			

Table I. Required submittal list - Continued

No.	Section Reference	Submittal Description	App	Info	Approval Authority	Initial /Date
12	02080 para 1.3K	CPR Certification		X		
13	02080 para 1.3L	Insurance Coverage Certification	X			
14	02080 para 1.3M	Sampling List	X			
15	02080 para 1.3N	Operator’s Log and Shipper’s Log	X			
16	02080 para 1.3O	Daily Logs: Sign-In and Field Notes	X			
17	02085 para 1.4A	Employee Certification	X			
18	02085 para 1.4B	Training and Medical Certification		X		
19	02085 para 1.4C	Notice of Violation		X		
20	02085 para 1.4D	Environmental, Health, and Safety Plan	X			
21	02085 para 1.4E	Training and Hazard Communications Certification	X			
22	02085 para 1.4F	Product List	X			
23	02085 para 1.4G	Lead Abatement Plan	X			
24	02085 para 1.4H	Air and Substrate Sampling Report		X		
25	02085 para 1.4I	Testing Certifications and Air Sampling Reports		X		
26	02085 para 1.4J	Air Monitoring Results		X		
27	02085 para 1.4K	Equipment List		X		
28	02085 para 1.4L	Rental Equipment List		X		
29	02085 para 1.4M	Shower Water Test Results		X		
30	02220 para 1.2	Proposed Methods and Operations of Demolition	X			
31	03300 para 1.4A	Fiber Reinforcement	X			
32	03370 para 1.3A	Product Data	X			
33	03370 para 1.3B	Manufacturer's Installation Instructions		X		
34	03930 para 1.3A	Product Data	X			
35	03930 para 1.3B	Manufacturer's Instructions	X			
36	03930 para 1.3C	Manufacturer's Certification		X		
37	05312 para 1.4A	Shop Drawings	X			
38	05312 para 1.4B	Product Data	X			
39	05312 para 1.4C	Manufacturer's Installation Instructions		X		
40	05312 para 1.4D	Manufacturer's Certification		X		
41	05312 para 1.4E	Welders and Welding Qualification	X			
42	05400 para 1.3A	Product Data	X			
43	05400 para 1.3B	Manufacturer's Installation Instructions		X		
44	05400 para 1.3C	Welders and Welding Qualifications	X			
45	05500 para 1.4A	Shop Drawings	X			
46	05500 para 1.4B	Welded Connections on Drawings	X			
47	05500 para 1.4C	Welders and Welding Qualifications	X			

Table I. Required submittal list - Continued

No.	Section Reference	Submittal Description	App	Info	Approval Authority	Initial /Date
48	05810 para 1.3A	Product Data	X			
49	05810 para 1.3B	Shop Drawings	X			
50	05810 para 1.3C	Samples	X			
51	07213 para 1.3A	Product Data	X			
52	07213 para 1.3B	Manufacturer's Certification		X		
53	07591 para 1.4A	Roof Tear-Off and Replacement Schedule	X			
54	07610 para 1.3A	Shop Drawings	X			
55	07610 para 1.3B	Product Data	X			
56	07610 para 1.3C	Samples	X			
57	07610 para 1.3D	Engineering Data	X			
58	07610 para 1.3E	Manufacturer's Roof Warranty		X		
59	07900 para 1.3A	Product Data	X			
60	08114 para 1.3A	Shop Drawings	X			
61	08114 para 1.3B	Product Data	X			
62	08114 para 1.3C	Samples	X			
63	08114 para 1.3D	Manufacturer's Installation Instructions	X			
64	08114 para 1.3E	Manufacturer's Certification		X		
65	08115 para 1.3A	Shop Drawings	X			
66	08115 para 1.3B	Product Data	X			
67	08115 para 1.3C	Samples	X			
68	08115 para 1.3D	Manufacturer's Installation Instructions	X			
69	08115 para 1.3E	Manufacturer's Certification		X		
70	08710 para 1.3A	Shop Drawings	X			
71	08710 para 1.3B	Samples	X			
72	08710 para 1.3C	Manufacturer's Installation Instructions	X			
73	08800 para 1.3A	Product Data	X			
74	15260 para 1.3A	Product Data	X			
75	15260 para 1.3B	Manufacturer's Installation Instructions	X			
76	15290 para 1.4A	Product Data	X			
77	15290 para 1.4B	Manufacturer's Installation Instructions	X			
78	15530 para 1.4A	Product Data	X			
79	15530 para 1.4B	Test Reports	X			
80	15830 para 1.3A	Product Data	X			
81	15830 para 1.3B	Manufacturer's Installation Instructions	X			
82	15830 para 1.3C	Manufacturer's Certification	X			
83	15830 para 1.3D	Operation and Maintenance Data	X			
84	15850 para 1.3A	Product Data	X			
85	15910 para 1.4A	Shop Drawings	X			
86	15910 para 1.4B	Product Data	X			

Table I. Required submittal list - Continued

No.	Section Reference	Submittal Description	App	Info	Approval Authority	Initial /Date
87	15910 para 1.4C	Manufacturer's Installation Instructions	X			
88	15910 para 1.4D	Location of Access Doors		X		
89	16120 para 1.3A	Product Data	X			
90	16130 para 1.3A	Manufacturers' Descriptive Literature	X			
91	16195 para 1.3A	Product Data	X			
92	16440 para 1.3A	Equipment/Material List	X			
93	16440 para 1.3B	Manufacturers' Descriptive Literature	X			
94	16480 para 1.3A	Equipment/Material List	X			
95	16480 para 1.3B	Manufacturers' Descriptive Literature	X			
96	16500 para 1.5A	Equipment/Materials Listing		X		
97	16500 para 1.5B	Manufacturer's Descriptive Literature	X			
98	16720 para 1.4A	Shop Drawings	X			
99	16720 para 1.4B	Catalog Cut Sheets		X		
100	16720 para 1.4C	Sequence of Operation	X			
101	16720 para 1.4D	Operation and Maintenance Manuals		X		
102	16720 para 1.4E	Fire Alarm Test Results	X			
103	16720 para 1.4F	Test Results to Fire Chief		X		

Table I. Required submittal list - Completed.

END OF SECTION

SECTION 02080
ASBESTOS REMOVAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal and disposal of asbestos materials.

1.2 CODES AND STANDARDS

A. AEDC Safety Standards:
1. A9 Hazard Communications, 1996.
2. B5 Confined Spaces, 1997.
3. E7 Asbestos, 1997.
4. E18 Chemical and Petroleum Products Waste Management, 1998.

B. American National Standards Institute (ANSI) Standards:
1. Z9.2-91 Fundamentals Governing the Design and Operation of Local Exhaust Systems.
2. Z88.2-92 Respiratory Protection.

C. American Society of Mechanical Engineers (ASME) Standard:
1. A13.1-96 Scheme for the Identification of Piping Systems.

D. Code of Federal Regulations (CFR):
1. 29 CFR 1910.134 Respiratory Protection, 2000.
2. 29 CFR 1910.1200 Hazard Communication, 2000.
3. 29 CFR 1926.55 Gases, Vapors, Fumes, Dusts, and Mists, 2000.
4. 29 CFR 1926.59 Hazard Communication, 2000.
5. 29 CFR 1926.1101 Asbestos, 2000.
6. 40 CFR 61 National Emission Standards for Hazardous Air Pollutants (NESHAP), 2000.
7. 40 CFR 260 Hazardous Waste Management Systems: General, 2000.
8. 40 CFR 261 Identification and Listing of Hazardous Wastes, 2000.

E. Public Law (PL):
1. 101-637 The Asbestos School Hazard Abatement Reauthorization Act (ASHARA), 1992.

F. Tennessee Department of Environment and Conservation Standard:
1. Chapter 1200-3-11-02 Hazardous Air Contaminants, Asbestos, 1998.

1.3 SUBMITTALS

A. Evidence satisfactory to the Contracting Officer that the firm removing asbestos has at least one designated employee on site during all abatement activity who has received certification by completing an Asbestos Abatement Contractor Training Course approved or sponsored by the U. S Environmental Protection Agency (EPA) and who will be responsible for the work whenever any phase of the project is in progress. The course shall be a 5-day supervisory course. A 1-day supervisory refresher course also is acceptable if documents showing completion of the initial 5-day course are submitted and the refresher course or courses have been completed within the required time frame to maintain currency in EPA certifications. This training shall have been completed within 12 months prior to the bid opening date. Certification shall remain current throughout the course of the job and shall comply with 40 CFR 61 and PL 101-637.

B. Written certification that all employees involved in the asbestos removal have received training and medical examinations as required by 29 CFR 1926.1101 and 29 CFR 1910.134, respectively. Certification includes respirator fit test records and a copy of respirator operating procedures and program, as specified in 29 CFR 1910.134. Include with the certifications dates of the most recent training, medical examinations, and a physician's statement indicating that workers are physically able to perform asbestos work and use the required respiratory and general body protection. Provide this information for all personnel including management and any air monitoring personnel on the job site before their first entry onto the job site. Keep information current during all phases of the job.

C. A copy of the hazard communications program and certification that all employees have been trained concerning the hazard communications standards and the written program in accordance with 29 CFR 1910.1200 and/or 29 CFR 1926.59.

D. A list of products to be used and a Material Safety Data Sheet (MSDS) for each. Products include, but are not limited to, aerosol sprays of any kind, wetting and cleaning agents, fuels, solvents, and paints. MSDS’s will be kept in a notebook and will be indexed for easy reference. This MSDS notebook shall remain available to all employees on the job site at all times.

E. A list of all equipment to be used and manufacturers’ literature showing that the equipment and materials meet all EPA, Occupational Safety and Health Administration (OSHA), and ANSI standards for use in asbestos abatement activities. Do not use materials that are or will create hazardous waste as described in 40 CFR 261.

F. Any citation or notice of violation from any Government agency issued as a result of work performed under this contract or any contract conducted in the

last three years. If none have been received, submit a letter certifying that none have been received.

G. Environmental, health, and safety plan that addresses all environmental, health, and safety aspects of the job. Submit this plan within 30 calendar days after award of the contract and before any field work begins. Include methods to ensure safety including a lockout/tagout plan; job safety analysis; tool box safety meeting minutes; accident reports and investigations; lead-testing data/certification; fall protection systems; shop drawings; procedures for disposing of waste, scrap, and excess materials; and procedures for work involving transportation or disposal of hazardous waste. The plan shall address all other environmental, health, and safety concerns associated with the job, including a hazardous waste management plan in accordance with 40 CFR 260, a fire safety plan, and procedures for addressing other emergencies within the work area and in compliance with 29 CFR 1926.55.

H. Asbestos removal plan including the precautions to be taken in this work. Do not proceed without the Contracting Officer's written approval of the plan. The plan shall include location of control areas and change rooms; layout of change rooms; location of hot and cold running water shower facilities; types of air machines used; kinds of interface of trades involved in the construction; schedule for sequencing of asbestos-related work; plan for asbestos disposal; type, manufacturer, and name of wetting agent and asbestos sealer to be used; air monitoring; and a detailed description of the pollution control method to be used. The plan shall also state the method proposed to handle oversized asbestos material (too large for bagging). Include dates of proposed work commencement and completion (by phases, if more than one phase is required or proposed).

I. Air sampling reports are to include the results of daily area and personal air and excursion limit sampling along with negative pressure differential documentation.

J. Testing certifications.
   1. Evidence that all air sampling is analyzed by a laboratory in full compliance with the OSHA Reference Method and which participates in an inter-laboratory quality assurance program or is accredited by the American Industrial Hygiene Association.
   2. Evidence that all persons analyzing samples have successfully completed the required National Institute for Occupational Safety and Health (NIOSH) and EPA-approved courses and been certified proficient by successfully participating in a NIOSH Proficiency Analytical Testing (PAT) (air) or National Institute of Standards and Technology (NIST) program within the last year.
   3. Should the contractor choose to collect and analyze bulk samples, submit evidence that the laboratory analyzing asbestos bulk samples is a NIST-accredited laboratory. (Bulk samples may be collected only with the

permission of the Contracting Officer and shall be returned to AEDC for disposal.)

K. Certification that persons monitoring work in confined spaces have successfully completed a course in cardiopulmonary resuscitation (CPR) by the American Red Cross or the American Heart Association.

L. Evidence that the firm removing asbestos has suitable insurance to cover any asbestos liabilities.

M. A list of the sampling numbers required by paragraph 3.1B.

N. AEDC asbestos landfill Operator's Log and Shipper’s Log (Form GC-1622). This form will be provided by the Government representative.

O. Daily logs.
   1. Sign-in logs will be submitted at least monthly and when the job is completed. Sign-in logs will include the following information for all persons entering the controlled area:
      a. First and last name (must be legible).
      b. Company and organization.
      c. Social security number.
      d. Date and time of arrival and departure.
      e. Reason of visit.
   2. Field notes will also be submitted at least monthly and when the job is completed.

1.4 QUALITY ASSURANCE

A. Demolish, remove, and dispose of asbestos materials as indicated on the drawings and specified herein. For the purposes of this specification, full-gross removal containment is required for any removal activity that takes two people over four hours to complete or that is required in 29 CFR 1926.1101. During removal, workers shall not leave the enclosure except for life-threatening emergencies. This applies only to removal activity and not to enclosure construction or final area clean-up.

B. Use glove bag techniques as described in 29 CFR 1926.1101 and paragraph 3.7C, for small sections. If samples taken during initial glove bag work exceed 0.01 fiber per cubic centimeter (f/cc), stop the job and remove all remaining asbestos using full-gross removal containment. Gross removal methods utilizing full decontamination units as described in 29 CFR 1926.1101, Appendix F, shall be the method of removal.

C. On small sections of pipe, valves, or other small areas of abatement where the glove bag is not suitable and full-gross removal containment is not required, mini-enclosures as specified in 29 CFR 1926.1101 may be used.

Mini-enclosures shall be equipped with high-efficiency particulate air (HEPA) filtered exhaust ventilation.

D. Assume unidentified insulating material to be asbestos.

PART 2 PRODUCTS

2.1 AIR RETURN FILTERS

A. 1-inch-thick disposable random fiber.

2.2 ENCAPSULANTS

A. Dryable to clear appearance and paintable with standard latex paints (American Coatings Corporation Cable Coating 22P Penetrating Sealant and Lock Down, or approved equal).

PART 3 EXECUTION

3.1 CONTROL OF WORK: Control work locations where the generation of asbestos dust could expose persons not properly protected.

A. Use safety ropes and barricades and post with 20-inch by 14-inch signs bearing the following warning:

DANGER

ASBESTOS

CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

B. Record all sampling numbers identified on asbestos material to be removed.

C. Ensure isolation of the work area or construction of the enclosure complies with 29 CFR 1926.1101. In addition, a continuous layer of true 6-mil polyethylene or other impermeable material shall first be applied to the floor and extend 12 inches up the wall. Use a layer of true 4-mil polyethylene for the first wall and ceiling and extend 12 inches onto the floor. Place the second layer of true 6-mil polyethylene on the floor and extend 18 inches up the wall and follow by the second layer of true 4-mil polyethylene on the walls and ceiling and extend 18 inches onto the floor. Polyethylene used for floors and walls shall be installed in such a manner to prevent ballooning of the polyethylene from the walls or floors. Drop and splatter sheets shall also be used in all containments in addition to the use of the two layers of polyethylene on the walls and the three layers on the floors of the

containment. In special situations, such as enclosures constructed outside, you may elect to construct the entire containment out of true 6-mil polyethylene or other impermeable material also supported by plywood or other rigid material.. Coordinate such construction with the Government representative. Enclosures constructed to contain asbestos work such as around equipment, utility systems, windows, doors, or other industrial systems shall be constructed of lumber (such as two by fours) or other rigid material supported on centers no greater than 48 inches apart and in a manner that shall maintain the integrity of the containment and prevent containment failure and release of asbestos fibers outside the work area. The use of wire, cable and other non-rigid systems shall not be used as containment framework or to otherwise hold polyethylene unless also supported by lumber or other rigid material on no greater than 48-inch centers. Support of polyethylene by wire, cable or other non-rigid materials by themselves shall not be allowed. Polyethylene sheeting shall be attached to the lumber or other rigid material and held in place through the use of spray glue, wooden screen molding nailed or screwed in place, duct tape and/or other mechanical methods.

D. Construct hygiene facilities for decontamination of workers and equipment in the same way except use true 6-mil polyethylene for walls, ceiling, and floor. Hygiene facilities for decontamination of workers and equipment must be contiguous with the work area in all instances. Construct doors so that flaps completely isolate the rooms in the event of air exhaust ventilation failure and allow easy access for personnel and equipment. The clean room shall be large enough to accommodate at least three workers. Prevent direct viewing into the shower, clean room, or dirty room by other personnel by constructing the walls and ceilings of these areas of black polyethylene.

E. All negative pressure enclosures shall be smoke tested after initial setup and at the beginning of each work shift.

F. Ensure that the enclosure walls, floor, and œiling do not billow or pull out more than 6 inches from the walls or floors to allow for effective cleaning and easy movement of personnel and equipment while inside.

G. Repair damaged barriers and correct defects as soon as they are discovered. Visually inspect containment barriers at the beginning of each work period. The Government representative may use smoke tube methods to test barrier effectiveness.

H. Do not commence work until signs are posted, required isolation barriers are erected, and the Contracting Officer or the Government representative has authorized the work to begin. In addition, all equipment such as ladders, scaffolds, HEPA vacuums, air machines, trucks, and other tools and equipment are subject to visual inspection and bulk sampling to ensure that no asbestos debris or contamination is brought onto AEDC from the

contractor's previous jobs. Wrap in two layers of true 6-mil polyethylene sheeting or properly bag any items that have visible debris, label ASBESTOS, and remove from AEDC. Encapsulation of items is not sufficient justification to use contaminated equipment. Items that do not pass visual inspection shall not be cleaned at AEDC.

I. Turn off all building ventilation air systems during preparation and until the area has passed final visual inspection and final air sampling by the Government representative. Remove all heating, ventilation, and air conditioning system filters before commencing asbestos removal and treat them as asbestos contaminated. Seal all air supply and return openings with true 6-mil polyethylene. Replace filters with new ones following the approved inspection.

J. Clean the work areas of all visible asbestos debris prior to placing polyethylene sheets or beginning asbestos containment work. Establish critical barriers before beginning clean-up work.

K. Completely decontaminate all ladders, vacuum cleaners, air machines, and other equipment used during abatement activities prior to removal from the abatement area. Cover all such equipment with true 4-mil polyethylene sheeting and duct tape prior to abatement activity. Seal all openings to air machines with true 6-mil polyethylene prior to their removal from an abatement area and any time they are not in operation. Wrap vacuum cleaner hoses with polyethylene. Seal all open ends of vacuum hoses or intake openings of vacuums with duct tape when not in operation to contain the asbestos. Seal ladder rungs, steps, and sides in polyethylene before use in an abatement area to ensure their complete decontamination following abatement. Clean and completely decontaminate all pump-up sprayers, tools, and equipment following abatement. If they cannot be decontaminated, dispose of them as asbestos material in the AEDC asbestos landfill, which is located approximately 2 miles west of the Avenue E and Sixth Street intersection.

3.2 RESPIRATORY PROTECTION REQUIREMENTS

A. Establish a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134 and 29 CFR 1926.1101. The Government will strictly enforce the OSHA "no facial hair/respiratory policy" for all personnel who wear respirators at any time during the job.

B. Ensure workers are clean shaven daily immediately preceding their work shift and before wearing respiratory protection.

C. Provide spectacle inserts to personnel wearing full-face respirators who normally wear spectacles, otherwise they will not be allowed in the containment area. Do not allow contact lenses to be worn in asbestos areas.

3.3 PROTECTIVE EQUIPMENT

A. Use protective equipment that meets all Government standards for use in asbestos abatement. Use coveralls having headcovers and booties attached.

3.4 LOCAL EXHAUST SYSTEM

A. Provide a local exhaust system in the asbestos control area in accordance with ANSI Z9.2. Equip exhaust with absolute HEPA filters. When possible, HEPA-filtered air shall be exhausted to the outside of buildings. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.02 inches of water column relative to adjacent unsealed areas and provide a minimum of four complete air changes per hour. Provide continuous 24-hour-per-day monitoring of the pressure differential with an automatic recording instrument. In no case shall the building exhaust system be used as the local exhaust system for the asbestos control area. Filters on vacuums and exhaust equipment shall conform to ANSI Z9.2. Change HEPA filters at least every 700 hours for 12-inch HEPA filters or more often as required to ensure proper filtration of air. Change pre-filters as soon as visible accumulations occur on the filters, and change intermediate filters at least once per shift. If filter loading occurs (i.e., visible accumulations on prefilter), change more often. Conduct air monitoring during asbestos removal to ensure filter integrity and asbestos levels outside the enclosure remain at or below 0.01 f/cc. Provide and install a back-up HEPA air exhaust ventilation system to be used in the event of primary system failure. Do not use a system with a remote filter housing inside gross removal areas.

3.5 COMMUNICATION DEVICES

A. Do not use any two-way communication devices unless pre-approved by the AEDC Security Forces.

3.6 CONFINED SPACES

A. Ensure entry into confined spaces is consistent with AEDC Safety Standard B5. Before entering a confined space, make oxygen and Lower Explosive Limit (LEL) measurements using a NIOSH-approved O_2/LEL metering device. While persons are working in a confined space, designate a stand-by person to remain outside who has been trained within the last 12 months in cardiopulmonary resuscitation (CPR) by the American Red Cross or American Heart Association.

3.7 ASBESTOS REMOVAL

A. General: Comply with the rules of Tennessee Department of Environment and Conservation, Chapter 1200-3-11-.02, and 40 CFR 61. The Government will notify the Tennessee Air Pollution Control Board (ref 1200-3-11-.02 [2][d]1[ii]

and 2). The removal of asbestos insulation from existing piping or other surfaces shall be subject, but not limited, to the following:

1. Require personnel who work with asbestos to use disposable coveralls; disposable head, neck, and shoe coverings; non-porous gloves; eye goggles; and a NIOSH-approved respirator.
2. Saturate all asbestos materials with wetting agent and ensure the material stays damp during removal. Do not allow asbestos insulation to drop to the floor or ground. Place asbestos in a proper container and lower to the floor or ground as appropriate.
3. Protect all existing machinery, equipment, floors, and walls from contamination by asbestos waste.
4. Control the dispersal of asbestos particles through methods such as isolation and wetting of material before removal. Keep a HEPA-filter vacuum on the job site at all times for use in clean-up of asbestos debris and during glove bag removal.
5. Do not wear protective clothing off the job site or take home for laundering. Provide a decontamination locker room and a clean locker room for personnel required to wear whole-body special clothing. Keep street clothes in the clean locker. While still wearing respirators in the decontamination room, vacuum and remove asbestos-contaminated disposable protective clothing and seal in impermeable bags or containers for disposal. Locate a shower between the decontamination and clean locker rooms and require all employees to shower before changing into street clothes. Filter shower water to 1 micron prior to disposal in a sanitary sewer.
6. Do not smoke, eat, drink, chew tobacco or gum, or apply cosmetics at the job site. Ensure that workers are fully decontaminated prior to conducting any of these activities.

B. Small section removal: Use glove bags to remove asbestos material in small sections with two-person teams specifically trained in glove bag procedures. The Government will enforce strict observance of the glove bag techniques described in 29 CFR 1926.1101 and as specified herein.
   1. Place polyethylene under the work area.
   2. Wear full body protection (e.g., coveralls, booties, headcovers, and gloves) in addition to respiratory protection.
   3. Turn off ventilation systems located in the area during asbestos removal.
   4. Clean up and seal ventilation openings in the area.
   5. Establish critical barriers by sealing doors and windows or wall penetrations as necessary.
   6. Do not allow asbestos insulation to drop to the floor or ground.

C. Glove bag requirements: In areas where insulation has caused contamination under the pipe line, pre-clean the work area of all contamination before applying polyethylene worksheet or conducting any repair or glove bag activity.
   1. Use true 6-mil-thick transparent polyethylene glove bags.

2. Ensure that the diameter of the pipe insulation does not exceed one-third of the bag's working length.
3. Secure the glove bag with an air-tight seal of duct tape. Place duct tape around the pipe insulation first to form a smooth seal.
4. Ensure the glove bag is sealed by conducting a smoke test. A smoke test is conducted by inserting a smoke tube used in ventilation system analysis through the bag. If smoke leaves the bag, the seal is inadequate; and work will be discontinued until an adequate seal is achieved. Retest the glove bag after each failure.
5. Wrap any damaged pipe insulation, adjacent to the work area or capable of creating asbestos fallout as a result of glove bagging, in at least true 6-mil-thick plastic sheeting and seal tight with duct tape, or seal and repair with insulation mastic. In areas where insulation to be removed has deteriorated and the temporary repair may create a potential fiber release, use HEPA local exhaust ventilation during repair or removal.
6. Saturate all asbestos-containing materials within the glove bag with amended water prior to stripping. When using pump-up sprayers for wetting agents and encapsulants, place the spray wand through the side of the bag and seal holes prior to the start of asbestos removal.
7. Saturate the pipe with amended water after the insulation has been stripped and scrub with a brush to remove all visible asbestos material.
8. Seal any piping insulation ends created by the repair with an EPA-approved encapsulant and an insulation mastic.
9. Use a HEPA vacuum to collapse the glove bag. Seal the vacuum in the glove bag prior to asbestos removal and run continuously during shifting of glove bag.
10. Use negative pressure enclosure with HEPA local exhaust ventilation in areas where removal of badly deteriorated insulation is to occur, regardless of the amount of asbestos to be removed.
11. Double-bag the glove bag and all other asbestos-containing waste for disposal.

D. Floor tile removal requirements:
1. Post warning signs at the entrance to the renovation area.
2. Shut off the building HVAC system during tile removal and subsequent clean-up. Seal ductwork openings with polyethylene sheeting as required in paragraph 3.1I. Establish critical barriers to the work area by sealing doors, windows, and any wall penetration.
3. Conduct no other construction work in the renovation area while removing asbestos tile or during the clean-up of removed tile.
4. Pre-clean the floor tile to be removed of all visible construction debris and dust. This pre-cleaning is not considered asbestos removal unless damaged floor tile is removed during the process.
5. Seal all holes, floor penetrations, and utility tracks found in the floor to prevent asbestos contamination by tile, mastic, or contaminated water.
6. Cover the walls of the floor tile removal area with one layer of true 4-mil polyethylene to a height of 4 feet. Do not damage wall coverings during this process.

7. Remove floor tiles using methods that will not create any visible dust. The preferred method is to wet the floor, cover it with polyethylene, and let the floor remain wet overnight or longer. The water under the plastic should loosen the glue allowing easy dust-free removal of the tile. Use a hand sprayer to mist tiles as they are being removed to further reduce dust. Remove glue that might remain on the floor using a method that does not create dust. If a sanding method is used, it shall be done under wet conditions. Use a HEPA-filtered vacuum to remove any residue left on the floor by wet methods.
8. Dispose of floor tiles, residue, mops, and rags as asbestos-containing materials in the asbestos landfill. Ensure any solvents used for mastic removal do not result in a residue that is considered to be a hazardous waste as defined by the EPA. Do not place solvents in the AEDC asbestos landfill in a free-liquid state. Dispose of all asbestos-contaminated or asbestos-containing materials in two true 6-mil polyethylene bags especially designed for asbestos disposal. If the floor is mopped with water, treat mop water as asbestos-contaminated, solidify, and place in metal drums. Rinse water used to clean asbestos mastic from surfaces shall not be disposed of in the sanitary sewer system. Do not overload bags to the point that they might rupture. Pack asbestos waste containing sharp ends in a manner that will prevent any puncture of bags. Bagged asbestos floor tile or linoleum shall be disposed of in air-tight metal drums. When using metal drums, ensure they meet the requirements of paragraph 3.10D. Transport waste to the asbestos landfill in a covered truck.
9. When the odor of solvents used for mastic removal is detected in areas adjacent to removal area, ventilate the removal area using a HEPA-filtered air exhaust system until such odors are no longer detected. While this is occurring, stop all solvent use and general removal until odors are no longer detected in adjacent areas.
10. Monitor area, personnel, and clearance air in accordance with OSHA and EPA guidelines (see paragraph 3.8) during floor tile removal and document asbestos fiber concentrations.
11. The Government representative will visually inspect the area prior to job completion. Remove all tile and glue residue from floors prior to inspection. The floor shall be considered clean when mastic and floor tile on all surfaces of the floor have been removed. Clean cracks and holes, 1/16-inch or larger in width or diameter, of all mastic that may be removed using solvents, common utility knife, brushes, and HEPA vacuum without damaging the floor by chipping. Cracks and holes smaller that 1/16-inch shall be considered clean if their surfaces have been cleaned of mastics using solvents, brushes, and HEPA vacuum and shall generally be treated the same as non-cracked surfaces.
12. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.

E. Window glazing requirements: Remove windows containing only asbestos glazing compounds by doing the following in addition to the requirements of other applicable sections of this specification.

1. Establish critical barriers to the general work area by sealing doors, wall penetrations, and ductwork vents as appropriate.
2. Post the asbestos warning signs.
3. Using duct tape and polyethylene, seal all exposed asbestos materials to prevent fiber release during window removal.
4. Pre-clean the windows, seals, floor, and ground as necessary to remove asbestos contamination located in these areas. Outside, clean the ground a distance of approximately 3 feet from the building and 2 feet to the left and right of each set of windows to remove ground contamination. Remove visible debris only.
5. Remove the windows with care. Wrap each in two layers of 6-mil polyethylene, label as asbestos, and dispose of in the asbestos landfill as described in paragraph 3.10.
6. Protect all existing finishes, furniture, and fixtures.
7. Coordinate the window removal with the window replacement.
8. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.

F. Window caulking requirements: Remove windows containing asbestos caulking compounds by doing the following in addition to the requirements of other applicable sections of this specification.
1. Establish critical barriers to the general work area by sealing doors, wall penetrations, and ductwork vents as appropriate.
2. Post the asbestos warning signs.
3. Pre-clean the windows, sills, floors, and ground as necessary to remove asbestos contamination located in these areas. Outside, clean the ground a distance of approximately 3 feet from the building and 2 feet to the left and right of each set of windows to remove contamination. Remove visible debris only.
4. Construct mini enclosures on the inside and outside of the windows and exhaust to the outside using HEPA filtration machines.
5. If asbestos glazing compounds are present, seal all exposed asbestos materials to prevent fiber release. Remove caulking compounds using wet methods and HEPA-filtered vacuums. Clean windows of all caulking materials or dispose of the entire window in the asbestos landfill as described in paragraph 3.10.
6. Protect all existing finishes, furniture, and fixtures.
7. Coordinate the window removal with the window replacement.
8. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.

G. Ventilation ductwork removal requirements: Remove ventilation ductwork, which is insulated with a non-asbestos material held in place by asbestos-containing glue or mastic, by doing the following in addition to the requirements of other applicable sections of this specification and 29 CFR 1926.1101.
1. Establish critical barriers to the general work area by sealing doors, windows, wall penetrations, and ductwork vents as appropriate.
2. Post the asbestos warning signs.
3. Place a true 6-mil polyethylene worksheet under the work area.

4. Carefully wet the insulation mastic and the wrap the ductwork with one layer of true 6-mil polyethylene.
5. When cutting a duct in sections, strip insulation and mastic from the area of the cut using wet methods and seal the edges of the insulation and mastic before cutting. Take care to prevent mastic fallout from the duct due to vibration caused by cutting.
6. After removing the duct from the ceiling area, wrap the duct with a second layer of true 6-mil polyethylene and label for disposal.
7. Clean any residue mastic remaining on the floor, roof deck, duct hangers, or ceiling frames.
8. Ensure compliance for Class II asbestos as stated in 29 CFR 1926.1101.

3.8 AIR MONITORING: Monitor airborne concentrations of asbestos fibers in accordance with 29 CFR 1926.1101 and as specified below:

A. Monitoring during asbestos work: Provide personnel and area monitoring and establish an 8-hour time-weighted average and 30-minute excursion level concentration during the first exposure to airborne asbestos to document exposure levels and determine respiratory protection requirements. Thereafter, when the same type of work is being performed, provide area monitoring once per work shift inside the asbestos control area, outside the entrance to the asbestos control area, and at the exhaust opening of the local exhaust system. Due to other areas of the building being occupied during asbestos removal, collect samples from all sides of the work area to verify air quality outside the containment. This includes sampling on the second floor above the asbestos work area. Sampling shall be done each shift. If monitoring outside the asbestos control area shows airborne concentrations above 0.01 f/cc, stop all work, notify the Government representative immediately, and correct the condition causing the increase. Provide results of sampling to the Contracting Officer as soon as possible following collection of the sample. A primary calibration standard is the standard of choice. However, a secondary standard may be used if a calibration curve for that standard is on-site in the field with the secondary standard and the curve compared to a primary standard within 3 months of the sample collection date. Conduct air sampling following the current OSHA Sampling Reference Method, which includes field calibration of sample pumps immediately before and after air sampling.

B. Monitoring after final clean-up: Provide area monitoring of asbestos fibers and establish a quality level of less than 0.01 f/cc after final clean-up but before removing the enclosure of the asbestos control area. If any of the final samplings indicates a higher value, take appropriate action to re-clean the area and repeat the monitoring. Provide sample results to the Contracting Officer prior to removal of any enclosures or barriers.

C. Provide the results of all air samples as soon as possible following collection and analysis. Include the location of their collection (for example, area [where], personnel [who]), sample number, start and stop times, dates of

collection, duration of sampling, flow rate in liters per minute, sample volume, total fiber count, detection limit of the analysis and airborne fiber concentration in fibers per cubic centimeter of air, name of the laboratory, and name of the person analyzing the samples. Make field notes used at the job site during sample collection available at any time to the Government representative upon request.

D. Should you analyze bulk samples, use a laboratory accredited by NIST. Air samples shall be analyzed by a laboratory which is in full compliance with the OSHA Reference Method and participates in the required inter-laboratory quality assurance program. Any persons analyzing these samples shall have attended the required NIOSH- and EPA-approved courses and shall have been determined proficient by successful participation in a NIOSH-PAT (air) or NIST program within the last year. This proficiency shall remain current throughout the course of the project. Return bulk samples to AEDC for disposal.

3.9 VENTILATION

A. In a non-gross removal area, ventilate the local areas with a HEPA-filtered air exhaust ventilation system during clean-up of areas greater than 400 square feet or when gross asbestos contamination presents such a hazard to warrant the use of a HEPA local exhaust system to control the hazard. See paragraph 3.1K for clean-up in a gross removal area.

3.10 DISPOSAL

A. Seal asbestos-contaminated material, disposable coveralls, disposable protective equipment, polyethylene, wood, and all other material used for enclosures and scrap in a clear true 6-mil sealed impermeable bag. HEPA vacuum all trapped air from each disposal bag before sealing and place in another true 6-mil labeled, sealed impermeable bag. Bags filled or rebagged at the asbestos landfill do not have to be HEPA vacuumed (see subparagraph C). Label the outer bag with the following warning:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD

B. Capture water and fluids used in wet method control and cleaning, and place in labeled, sealed impermeable containers. Label the containers with the same warning required in paragraph 3.10A. Filter water through 1-micron filters before allowing water to pass to a sanitary sewer. Do not place free liquids in the AEDC asbestos landfill.

C. Dispose of all asbestos waste in the AEDC asbestos landfill. Coordinate times of delivery with the Government representative (normally from 7 am to 1 pm, Monday through Friday). When landfill conditions preclude adequate covering of asbestos, disposal will not be permitted. This determination will be made by the Government representative. These conditions will include, but are not limited to, excessive moisture in the landfill caused by the weather. When this condition occurs, the asbestos will be stored at AEDC at the contractor's expense until the Government grants disposal authority. Do not dispose of asbestos material in any area other than the asbestos landfill. Remove and dispose of all asbestos dust particles and waste generated during each work period at the end of each work period. Place bagged waste not taken to the landfill at the end of the shift in secure areas, such as a locked panel truck, prepared for disposal as indicated in paragraph 3.11.

D. Place asbestos materials, which contain sharp edges or are too heavy to be placed in true 6-mil polyethylene bags, in clean, new, or reconditioned, practically air-tight metal drums. Reconditioned drums are drums which have been emptied as specified in 40 CFR 261 and repainted inside and out.

E. Do not place any hazardous waste, as defined in 40 CFR 261, in any AEDC landfill. Where hazardous waste is generated or removed, follow the procedures given in AEDC Safety Standard E18. Coordinate with the Government representative in completing Forms GC-565 and GC-1337.

F. All users of the asbestos landfill are required to obtain an AEDC Disposal Permit. (Refer to AEDC Safety Standard E7 for permitting procedure and permit requirements.)

G. Complete Form GC-1622, AEDC Asbestos Landfill Operators Log and Shipper's Log, for each load of asbestos waste. Form GC-1622 will be provided by the Government representative.

H. Only properly containerized, labeled, and adequately wet asbestos accompanied by a completed Form GC-1622 and an AEDC Disposal Permit shall be transported to or disposed of in the asbestos landfill.

3.11 TRANSPORTATION

A. Transport properly bagged and identified asbestos waste in a metal panel truck or trailer which is prepared as follows:
   1. Bed lined with three layers of true 6-mil polyethylene which overlap walls by at least 12 inches; line the walls with two layers of true 4-mil polyethylene; and line the doors to the enclosed bed lined with two layers of true 4-mil polyethylene.
   2. Seal the truck or trailer to prevent any water or contamination leakage.
   3. Equip the doors to the lined enclosure with a security lock.

B. The truck or trailer will be inspected by the Government representative before asbestos is loaded and after disposal.

C. When transporting asbestos on the open highway, follow current Department of Transportation regulations.

3.12 SEALING

A. Reseal any asbestos material that is not in the job scope for removal but is exposed as part of this work. Seal with a Government-approved bridging encapsulant and insulation mastic to contain and prevent future damage of the asbestos. If outside, ensure material used will withstand weathering.

3.13 SAFETY

A. Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to personnel and damage to existing equipment and structures. Minimize the generation and spread of dust and flying particles.

3.14 HAZARD COMMUNICATIONS

A. Maintain and implement a written Hazard Communications Program as required by 29 CFR 1910.1200 and AEDC Safety Standard A9. Ensure all employees and anyone else involved with the abatement job are familiar with the program and its location. Ensure all other requirements outlined in AEDC Safety Standard A9 are met.

3.15 UTILITIES

A. Do not interrupt existing utilities or commence power outages without written permission from the Contracting Officer or the Government representative. Obtain an AF Form 103, BCE Work Clearance, from the Government representative prior to interrupting utilities. Do not remove asbestos from active steam or electrical lines. Wait for appropriate utility outages. Provide backflow prevention devices as required to prevent cross-contamination of water supplies.

3.16 GENERAL CLEAN-UP

A. Remove dust, dirt, and debris caused by demolition operations from adjacent structures and improvements. Return adjacent areas to their condition prior to the start of the work.

3.17 LABELING

A. Stencil new and replaced insulation with the word “NON-ASBESTOS,” in accordance with ANSI A13.1, at the edges of replaced sections. Indicate the

direction of replacement with arrows using a 1-inch stripe to indicate the boundaries. Place the word “NON-ASBESTOS” at intervals not exceeding 25 feet using a highly visible paint.

B. Place labels identifying piping systems (e.g., 30 lb. steam, raw water, heated potable water) as appropriate for newly insulated piping systems.

3.18 DEBRIS DISPOSAL

A. Transport debris, rubbish, waste, and other non-asbestos materials resulting from demolition from the site to the construction landfill which is located approximately 2 miles west of the Avenue E and Sixth Street intersection. Do not place edibles or garbage in the construction landfill; use existing dumpster boxes.

B. Dispose of all material contaminated by asbestos in the asbestos landfill as described in paragraph 3.10.

3.19 VISUAL INSPECTIONS

A. Visually inspect the work area after pre-cleaning and before placing any polyethylene sheeting. Re-clean and inspect any area where cleaning has not been adequately done before placing polyethylene sheeting. Inspect polyethylene enclosures for adequacy prior to removing any asbestos. Do not start abatement procedures prior to release by a Government industrial hygienist who will visually inspect the area for cleanliness and enclosure adequacy.

B. Assist in the visual inspection of all areas (enclosure areas cleaned, disposal bags, drums, trucks, and equipment used in asbestos removal) as requested by the Government representative. Include the opening of drums and bags or any other inspection activity.

3.20 ASBESTOS ABATEMENT COMPLETION

A. Do not remove protective barricades or enclosures until the Government representative concurs in writing. The Government may conduct independent, aggressive air monitoring at the conclusion of the removal operation to determine air quality. A reading of not more than 0.01 f/cc of air is required before barricades and enclosures shall be removed. The Government representative will visually inspect the affected surfaces for residual asbestos material and accumulated dust, and the contractor shall re-clean all areas showing dust or residual asbestos materials. If re-cleaning is required, monitor the airborne asbestos concentrations after re-cleaning. Remove the decontamination facility from the area following the final visual inspection and upon concurrence by the Government representative. Encapsulate interior of polyethylene walls, ceiling, floor, pipe surfaces, and other surfaces where asbestos has been removed following visual inspection. Keep the area

sealed, barriers intact, and HEPA-filtered air exhaust ventilation in operation until the results of final air samples are received. The Government representative will visually inspect the general work area following enclosure or barrier removal to ensure the work area has been adequately cleaned and to ensure that no damage has been done to buildings or equipment.

END OF SECTION

SECTION 02085
LEAD REMOVAL

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to the removal and disposal of lead-containing materials and other heavy metals (barium, cadmium, silver, mercury, and chromium).

1.2 CODES AND STANDARDS

A. AEDC Safety Standards:

1.	A6	User and Subcontractor Safety, 1996.
2.	A9	Hazard Communication, 1996.
3.	B1	Work Clearances, 1998.
4.	E17	Oil and Hazardous Substances Spill Response, 1998.
5.	E18	Chemical and Petroleum Products Waste Management, 1998.
6.	E19	Lead and Heavy Metals, 1997.

B. American National Standards Institute (ANSI) Standards:

1.	Z9.2-91	Fundamentals Governing the Design and Operation of Local Exhaust Systems.
2.	Z88.2-92	Practices for Respiratory Protection.

C. Code of Federal Regulations (CFR):

1.	29 CFR 1910.134	Respiratory Protection, 2000.
2.	29 CFR 1910.1200	Hazard Communication, 2000.
3.	29 CFR 1926.55	Gases, Vapors, Fumes, Ducts, and Mists, 2000.
4.	29 CFR 1926.57	Ventilation, 2000.
5.	29 CFR 1926.62	Lead Standard, 2000.
6.	40 CFR 260	Hazardous Waste Management Systems: General, 2000.
8.	40 CFR 261	Identification and Listing of Hazardous Waste, 2000.
9.	40 CFR 262	Generators of Hazardous Waste, 2000.
10.	49 CFR 172	Department of Transportation (DOT) Regulations for Use of Hazardous Materials Tables and for Communication, 2000.
11.	49 CFR 178	DOT Specifications for Packaging, 2000.

D. Environmental Protection Agency (EPA) Document:

1. SW-846	Proposed Sampling and Analytical Methodologies for Additions to Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, 1984.

E. Steel Structures Painting Council (SSPC) Standard:

1. Guide 7-95	Guide for the Disposal of Lead-Contaminated Surface Preparation Debris.

F. Public Law 102-550:

1. 102-550 Title X	Section 1017 of the Residential Lead-Based Paint Hazard Reduction Act of 1992.

G. Underwriters Laboratories, Inc. (UL) Standard:

1. 586-99	Safety High-Efficiency, Particulate, Air Filter Units.

1.3 DEFINITIONS

A. Action level: Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 µg/m^3 averaged over an 8-hour period. As used in this section, "30 µg/m^3" refers to the action level.

B. Area monitoring: Sampling of lead concentrations within the lead-control area and inside the physical boundaries which is representative of the airborne lead concentrations which may reach the breathing zone of personnel potentially exposed to lead.

C. Change rooms and shower facilities: Rooms within the designated physical boundary around the lead-control area equipped with separate storage facilities for clean protective work clothing and equipment and for street clothes which prevent cross-contamination.

D. Clearance level: Prior to the moving or removal of enclosures used for lead abatement, air samples will be taken by the Government representative to ensure that airborne levels of lead are at or below 3 µg/m^3. In addition, a detailed visual inspection will be conducted by the Government representative for all surfaces and equipment in the containment or control area. Surfaces include any portion of the containment including walls, ceilings, and floors, scaffolds, and any equipment or objects that are present in the containment or that have been used in the containment. The inspection will be conducted by wiping a clean cloth across all surfaces and inspecting the cloth for evidence of any dust. If any dust is found on the cloth, the contractor shall re-clean the entire containment until a detailed inspection is passed. All dust will be assumed to be lead- or heavy metal contaminated. When enclosures are not required, inspection of the work area will be conducted to ensure adequate decontamination of the area. This method will be used before

moving or removing containments or enclosures. Before containments are removed from AEDC, wipe and/or microvac samples will be collected from representative surfaces to determine if the containments have been cleaned to a level of 500 µg /ft^2 or less. If any one sample exceeds 500 µg /ft^2, then the entire containment shall be re-cleaned.

E. Decontamination room: Room designated for removal of contaminated personal protective equipment (PPE).

F. Designated lead-abatement supervisor: A person who has attended any 3- to 5-day lead-abatement course taught in the United States. The person shall be knowledgeable of Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), and other Government regulations.

G. Eight-hour time weighted average (TWA): Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

H. Grit blasting: Remove paint with recyclable steel grit or recyclable steel grit embedded in a synthetic open-cell polymer sponge.

I. High-efficiency particulate air (HEPA) filter equipment: HEPA-filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high-efficiency particulate filter means it is 99.97 percent efficient against 0.3-micron-size particles. This equipment may be containment exhaust systems or hand held paint removal equipment such as peeners, needle-guns, grinders, or sanders.

J. Lead: Metallic lead, inorganic lead compounds, and organic lead soaps.

K. Lead-control area: An enclosed area or structure with full containment to prevent the spread of lead dust, paint chips, or debris of lead-containing paint-removal operations. The lead-control area is isolated by physical boundaries to prevent unauthorized entry of personnel.

L. Lead permissible exposure limit (PEL): Fifty µg/m^3 as an 8-hour TWA as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula: PEL (µg lead/m^3) = 400/No. hrs. worked per day

M. Microvac: Alternate sampling method for surfaces that are not conducive to wipe sampling. Sampling is conducted using a 37mm air sampling cassette with 0.8 micron filters at a flow rate of approximately 4 liters per minute. Samples are vacuumed from a 6 in^2 area unless conditions require a smaller or larger sample area. Results will be reported in µg /ft^2.

N. µg/m^3: Micrograms per cubic meter of air (refers only to lead in this document).

O. µg /ft^2: Micrograms per square foot of surface (refers only to lead in this document).

P. Personal monitoring: Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour TWA concentration in accordance with 29 CFR 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

Q. Physical boundary: Area physically roped or partitioned around an enclosed lead-control area or area where HEPA filtered hand or power tools are used or chemical paint removal is being conducted. The barriers are placed to limit unauthorized entry of personnel. As used in this section, "inside boundary" shall mean the same as "outside lead-control area but within the roped-off area." In areas where enclosures are not used, this is the area where lead abatement work is being conducted.

1.4 SUBMITTALS

A. Evidence satisfactory to the Contracting Officer that the firm performing lead abatement has at least one designated employee on site during all abatement activity who has attended a lead-abatement course taught in the United States and who is knowledgeable in all aspects of lead abatement. Show this by course certification and description of past lead-abatement experience which includes a list of previous clients and a resume. Have physically on each individual job site at least one such designated supervisor directly responsible for the work whenever any phase of the project is in progress. Multiple enclosures being worked at the same time shall require individual lead-abatement supervisors responsible for each enclosure.

B. Written certification that all employees involved in lead abatement have received training and medical examinations as required by 29 CFR 1926.62. Certification includes respirator fit-test and training records and a copy of the respiratory protection program. Include with the certifications, dates of the most recent training, medical examinations, and a physician's statement indicating that workers are physically able to perform lead-abatement work and use the required respiratory and general body protection. Provide this information for all personnel including management and any air-monitoring personnel on the job site before their first entry within the job site. Training shall be accomplished prior to the time of initial job assignment. Keep the job information current for all employees during all phases of the job.

C. Any citation or notice of violation from any Government agency issued as a result of work performed under this contract or any contract engaged in

during the last 3 years. Submit a brief explanation of any cited incident. If none have been received, submit certification to that effect.

D. Environmental, health, and safety plan that addresses all environmental, health, and safety aspects of the job. Submit this plan within 30 calendar days after award of the contract and before any field work begins. The plan shall include the following information:

1. Identification of hazardous waste associated with the work.
2. Estimated quantities of wastes and/or hazardous wastes to be generated and disposed of.
3. Names and qualifications (experience and training) of personnel who will be working on site with hazardous waste.
4. List of the waste-handling equipment to be used in performing the work, to include cleaning, volume-reduction, and transport equipment.
5. Spill prevention, containment, and clean-up contingency measures to be implemented. Reference AEDC Safety Standard E17.
6. Work plan and schedule for waste containment, removal, and disposal. Waste shall be cleaned up and containerized daily.
7. Methods to control fugitive air emissions.
8. Methods to control employee exposure to lead during removal.
9. Methods to ensure safety including a lockout/tagout plan; job safety analysis; tool box safety meeting minutes; accident reports and investigations; lead-testing data/certification; fall protection systems; shop drawings; procedures for disposing waste, scrap, and excess materials; and procedures for work involving transportation or disposal of hazardous waste. The plan shall address all other environmental, health, and safety concerns associated with the job. The plan shall also include fire safety plan and procedures for addressing other work area emergencies in compliance with 29 CFR 1926.55, and a hazardous waste management plan in accordance with 40 CFR 260 and with applicable requirements of federal and local hazardous waste regulations.

E. A copy of the hazard communications program and certification that all employees have been trained concerning the hazard communications standards and the written program in accordance with 29 CFR1910.1200 and AEDC Safety Standard A9.

F. A list of products to be used and a Material Safety Data Sheet (MSDS) for each. Products include, but are not limited to, aerosol sprays of any kind, wetting and cleaning agents, fuels, solvents, paints, etc. MSDS’s shall be kept in a notebook and indexed for easy reference. This MSDS notebook shall remain available to all employees on the job site at all times.

G. A detailed job-specific plan of the work procedures to be used in the removal of lead paint. The plan shall include a sketch showing the

locations, size, and details of lead-control areas and the location and details of decontamination rooms, change rooms, shower facilities, and mechanical ventilation systems. Include eating, drinking, smoking, and restroom procedures; interface of trades; sequencing of lead-related work; collected wastewater (to include shower water) and paint debris disposal plan; air sampling plan; respirators; protective equipment; and a detailed description of the method of containment of the operation to ensure that airborne lead concentrations of $3\mu g/m^3$ are not exceeded outside the lead-control area. Include air sampling, training, strategy, sampling methodology, frequency, duration of sampling, and qualifications of air-monitoring personnel in the air-sampling portion of the plan. Obtain approval of the plan prior to the start of paint-removal work.

H. Air and substrate sampling reports.

I. Testing laboratory qualifications including the name, address, and telephone number of the testing laboratory selected to perform the monitoring, testing, and reporting of airborne and substrate concentrations of lead. The laboratory shall be accredited by the American Industrial Hygiene Association (AIHA). Provide AIHA documentation along with date of accreditation/re-accreditation. Samples collected to determine if materials are hazardous waste shall be analyzed by a laboratory qualified to conduct such analysis following Environmental Protection Agency Document SW-846. Provide split samples of any materials or media to the Government as requested for Government analysis.

J. Air-monitoring results submitted within 24 hours following the monitoring, signed by the person performing the air monitoring, the employee who analyzed the sample, and the designated site superintendent responsible for the lead-abatement operation. See paragraph 3.2.B.3 for additional information.

K. A list of all equipment, including water, air filters, and respirators to be used, and manufacturer's literature showing that the equipment and material meet all EPA, OSHA, and ANSI standards for use in lead-abatement activities. Include certification that vacuum- and air-filtration devices are filtered with HEPA filters. Include operating instruction for paint-removal equipment.

L. Equipment rental notifications (see paragraph 1.5C).

M. Shower water sample test results.

1.5 EQUIPMENT

A. Respiratory protection requirements: Establish a respiratory protection program as required by ANSI Z88.2, 29 CFR 1910.134 and 29 CFR 1926.62. The Government will strictly enforce the OSHA "no facial hair/respiratory policy" for all personnel who wear respirators at any time during the job.
   1. Ensure workers are clean shaven daily immediately preceding their work shift and before wearing respiratory protection.
   2. Provide spectacle inserts to personnel wearing full-face respirators who normally wear spectacles; otherwise, spectacles shall not be worn in lead-abatement areas.

B. Special protective clothing: Furnish personnel who will be exposed to lead-contaminated dust with appropriate disposable protective whole-body clothing, head coverings, gloves, and foot coverings. Use coveralls having head covers and booties attached. Furnish appropriate disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining concurrence from the Government representative.

C. Rental equipment notification: If rental equipment is to be used during lead-containing paint handling and disposal, notify the rental agency in writing concerning the intended use of the equipment. Furnish a copy of the written notification to the Contracting Officer (see paragraph 1.4L).

D. Vacuum and negative air machine filters: UL 586-labeled HEPA filters.

E. Decontamination: Completely decontaminate all ladders, vacuum cleaners, air machines, and other equipment used during abatement activities prior to removal from the abatement area. If they cannot be decontaminated, then dispose of them as hazardous waste.

F. Condition: Clean all equipment used at non-AEDC job sites prior to arrival at AEDC. Any contaminated equipment identified during inspection of incoming vehicles shall be removed from AEDC until cleaned. Any such equipment shall not be cleaned at AEDC. Do not remove any equipment used at AEDC that has not been decontaminated and inspected by the Government representative. All equipment and other articles are subject to inspection by Government representatives upon arrival or exit from AEDC. Contaminated equipment identified on out-going vehicles will be impounded by the Government until the contractor conducts adequate decontamination procedures.

PART 2 PRODUCTS

2.1 ABRASIVE MATERIALS (If applicable)

A. Abrasive blasting materials shall meet the requirements as specified in the paint schedule under "Surface Preparation."

B. Limits on the composition of abrasive materials: The soluble metal content and the total metal content shall not exceed values which would cause a material to be classified as a hazardous waste as defined in 40 CFR 261.

PART 3 EXECUTION

3.1 PROTECTION

A. Notification: Notify the Government representative 30 days prior to the start of any paint-removal work.

B. Lead-control area requirements:

1. Establish a lead-control area by completely enclosing the area or structure where lead-containing paint-removal operations are to be performed or isolate using barrier ropes and signs if containment is not required.

2. When enclosures are not required, place polyethylene sheeting on the ground or floor of the work area and out from the building a distance of at least twenty feet. Cover non-moveable objects with protective covering such as polyethylene. Close and tightly lock doors and windows when working near doors or windows. Protect brick and walls from contamination and remove prior dust and debris by HEPA vacuum and wet wiping. If doors and windows will not tightly close, seal with polyethylene from the inside of the building. If storm windows must be removed to allow repainting of windows, wet wipe and HEPA vacuum the entire storm window (both sides) to remove any lead contamination.
3. When building occupants are allowed to remain in the premises provide a safe, lead free access to and from the building during the work and at the end of the day. Provide adequate security to the work area and equipment to prevent any hazard to the area occupants.
4. Contain removal operations by the use of a negative-pressure full-containment system. Also see paragraph 3.1.I.
5. Enclosures used to control lead emissions shall consist of the lead-abatement work area, and a decontamination unit for personnel, consisting of a dirty equipment room, a shower equipped with hot and cold running water, and a clean change room for workers. A separate decontamination chamber shall be constructed for equipment decontamination and the safe passage of hazardous

wastes from the work area to the outside. Removal of contaminated dust-collecting filters from the recycling abrasive blasting and vacuuming machines shall be accomplished in a manner to prevent the contaminated dust from entering the environment. All personnel assigned to changing filters and cleaning the machinery shall be fully clothed with approved protective clothing and equipment. The clean room shall be equipped with lockers where clean respirators and street clothes are stored. No contaminated articles shall enter the clean room. Contaminated articles shall remain in the work area until cleaned or disposed of as hazardous waste. The decontamination units shall be constructed contiguous to the work area (enclosure), and the shower shall be constructed in a manner that requires the worker to pass from the dirty room through the shower stall into the clean room.

6. Filter shower water through a 1-micron filter or other filter system that will result in equivalent water filtration. Collect water and sample to determine if lead levels in the water are below 100 ppb if tested by a qualified laboratory or 50 ppb if tested by an approved field kit. If levels are below these concentrations, then the water may be discharged into the sanitary sewer. All water shall be collected and sampled before discharge using either a field measuring kit as described below or the results from a qualified laboratory. Sample results from the qualified laboratory shall be submitted to the Contracting Officer for approval prior to discharging the water. The Government representative may collect and test duplicate samples to ensure the integrity of the qualified laboratory performing the analysis. Field analysis conducted using portable test kits will be approved by the Government industrial hygienist prior to use. Colorimetric test kits such as CHEMetrics, Inc., Cat. No. K-8350, are such kits. Any water tested using field kits that indicates lead levels above 50 ppb shall be re-filtered and re-tested until field measurements are below 50 ppb or the water has been found to be less than 100 ppb using laboratory testing from a qualified laboratory. Sample results from the qualified laboratory shall be submitted to the Contracting Officer for approval prior to discharging the water. If field analysis is used, a Government representative will be present during all testing and field analysis. The holding tank used for the collection of contaminated water will be locked and unlocked by the Government representative to prevent the release of contaminated water to the environment before adequate filtering. The contractor shall provide the means of locking the tank; however, the Government representative will provide the lock.

7. Enclosures used for lead abatement shall be constructed of materials strong enough to withstand environmental elements (i.e., wind, rain, and snow) when outside. The containment shall comply with a Class 1 containment system as described in SSPC Guide 7 (CON). The containment shall be made of impermeable walls with

rigid or flexible framing, fully sealed joints, airlock entryways, and HEPA-filtered negative air achieved by forced air flow (verified by instrument monitoring). Air flow in the containment shall be maintained at a pressure differential of minus 0.02 inch of water. Air flow in the containment shall be maintained at a minimum of 100 ft/min for the cross draft ventilation and at least 60 ft/min for the down draft ventilation. Construct hygiene facilities for decontamination of workers and equipment similar to the main containment. Construct doors so that flaps completely isolate the enclosure in the event of air exhaust failure and allow easy access for personnel and equipment. The clean room shall be large enough to accommodate at least three workers at any one time. Prevent direct viewing into the shower, clean room, or dirty room by other personnel by constructing the walls and ceiling of these areas of black polyethylene or similar material. Provide detailed specifications, drawings, and load calculations of containment structure for 100 percent containment of lead emissions, grit, and dust. If the containment is to be used for abrasive blasting, blast shields shall be used to protect the outside walls of the containment from damage by blast media.

C. Protection of existing work to remain: Perform paint removal work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better.

D. Boundary requirements: Provide physical boundaries around the lead-control area by roping off the area. Ensure that airborne concentrations of lead will not exceed 3 µg/m^3 outside the lead-control area or enclosure.

E. Change room and shower facilities: Provide clean change rooms and shower facilities within the physical boundary around the designated lead-control area in accordance with requirements of 29 CFR 1926.62 and as outlined in paragraph 3.1.

F. Mechanical ventilation system:

1. Use adequate ventilation to control personnel exposure to lead in accordance with 29 CFR 1926.57.
2. Local exhaust system: Provide a local exhaust system in the lead-abatement area (enclosure) in accordance with ANSI Z9.2. Equip exhaust with absolute HEPA filters. HEPA-filtered air will be exhausted to the outside of buildings when work is conducted inside buildings. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.02 inches of water column relative to adjacent unsealed areas. Provide continuous 24-hour-per-day monitoring of the pressure differential with an automatic recording instrument. Filters on vacuums and exhaust equipment shall conform to ANSI Z9.2. Change pre-filters and HEPA filters often enough to ensure that lead concentrations at

the exhaust are at or below 3 µg/m^3. Provide and install a back-up HEPA air-exhaust ventilation system to be used in the event of primary system failure. Do not use a system with a remote filter housing inside the lead-removal area.

G. Personnel protection: Personnel shall wear and use protective clothing and equipment as specified herein. Eating, smoking, and/or drinking are not permitted in the lead-control area. No one shall be permitted in the lead-control area unless they have received appropriate training and protective equipment.

H. Warning signs: Provide warning signs at approaches to lead-control areas. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs shall comply with the requirements of 29 CFR 1926.62.

I. During building renovations where abrasive blasting is not used and paint must be removed by other means, such as HEPA-shrouded mechanical removal equipment, critical barriers and polyethylene enclosures may be used. The requirement for showers and HEPA negative pressure exhaust shall be dependent on air concentrations. If air concentrations are below the action level for lead, then showers shall not be required. Hand and face washing facilities shall be required. Submit methods of removal and control as required in paragraph 1.4.D. If work is done outside, then air concentrations within the work area shall be within acceptable limits as indicated in paragraph 3.1.D. above. Submit methods of removal and control as required in paragraph 1.4.D.

3.2 WORK PROCEDURES

A. Perform removal of lead-containing paint in accordance with the approved lead-containing paint removal plan. Use procedures and equipment required to limit occupational and environmental exposure to lead when lead-containing paint is removed in accordance with 29 CFR 1926.62 and 40 CFR 262, except as specified herein. (Dispose of removed paint chips and associated waste in compliance with federal and local requirements.) The hazardous waste shall be properly drummed and labeled as required by 49 CFR 172 prior to being moved by the contractor to an accumulation point, which is within one mile of the job site (see paragraph 3.9F).

1. Personnel exiting procedures: Whenever personnel exit the lead-controlled area, they shall perform the following procedures and shall not leave the work place wearing any clothing or equipment worn during the work day:
   a. Vacuum themselves.
   b. Remove protective clothing in the decontamination room, and place them in an approved impermeable 6-mil polyethylene disposal bag.
   c. Shower.

d. Change to clean clothes prior to leaving the physical boundary designated around the lead-contaminated job site.

B. Air monitoring: Monitor airborne concentrations of lead in accordance with 29 CFR 1926.62 and as specified below:

1. Monitoring during lead-abatement work: Provide personnel and area monitoring and establish an 8-hour TWA during the first exposure to airborne lead to document exposure levels and determine respiratory protection requirements. Provide continuous area monitoring during each work shift inside the lead-control area, outside the entrance to the lead-control area, and at the exhaust opening of the local exhaust system. If monitoring outside the lead-control area shows airborne concentrations above 3.0 µg/m^3, stop all work, notify the Government representative immediately, and correct the condition causing the increase. Conduct air sampling following OSHA and NIOSH guidelines which includes field calibration of sample pumps immediately before and after air sampling.
2. Collect personal air-monitoring samples on employees who are anticipated to have the greatest risk of exposure. In addition, take air-monitoring samples on at least 25 percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.
3. Submit the results of all air samples taken in support of the contract within 10 days following their collection. Include the location of their collection (for example, area [where], personnel [who], sample number, start and stop times, dates of collection, duration of sampling, flow rate in liters per minute, sampling volume, total lead concentration in µg/m^3, detection limit of the analysis, TWA of the representative employee's exposure, name of the laboratory, and name of the person collecting the sample and analyzing the samples). This information shall be submitted in a formal report to the Contracting Officer. Within 24 hours of sample collection, make the sampling available for the Government representative’s review. These may be laboratory reports or rough draft field data. Make field notes used at the job site during sample collection available at any time to the Government representative. Notify the Contracting Officer immediately of exposure to lead at or in excess of 3 µg/m^3 outside the lead-control area.
4. Monitoring after final clean-up: Provide area monitoring of lead concentrations and establish an air quality level of 3 µg/m^3 or less after final clean-up. Before moving or removing the enclosure from the lead-abatement control area, the Government representative will conduct a visual inspection of the area to determine its cleanliness. Once the visual inspection has been passed, the Government representative will collect clearance air samples to determine lead air concentrations. If the air samples indicate levels above 3 µg/m^3, then the contractor shall re-clean the enclosure,

and the visual inspection and clearance air sampling shall be repeated. This shall continue until an inspection is passed and a clearance sample is obtained. The contractor shall assist the Government representative to ensure adequate inspection of all surfaces of the enclosure and work areas. See paragraph 1.3.D.

C. Once the visual inspection and air samples meet necessary requirements, remove the enclosure.

3.3 LEAD-CONTAINING PAINT REMOVAL

A. Comply with the applicable procedure in Annex B, AEDC Safety Standard E19 and the following: Manual or power sanding/grinding of interior and exterior surfaces is not permitted unless accomplished in enclosure or done so using proper barriers, signs, HEPA vacuum attachments on equipment, and wet methods. Also see paragraph 3.1.B. and I. Remove paint within the areas as required to allow cutting or painting as identified under scope of lead abatement in section 1.1B. on the drawings and in the paint schedule in order to completely expose the substrate. Take whatever precautions are necessary to minimize damage to the underlying substrate if painting.

1. Mechanical paint removal and blast cleaning: Perform mechanical paint removal and blast cleaning in lead-control areas using negative-pressure full-containment with HEPA-filtered exhaust. Collect paint residue and spent grit (used abrasive) from blasting operations for disposal in accordance with CFR and local requirements.
2. Abrasive blasting and vacuum filtering system: The system used to collect residue paint and grit blast shall be contained in a HEPA-filtered exhausted enclosure to ensure that the emptying of residue, the maintenance of systems, and/or the replacement of filters are done in an enclosed restricted area that shall prevent the contamination of the outside work area. This enclosure area shall be constructed in accordance with the requirements for the main enclosure and will be inspected and cleared by the Government representative prior to its removal as indicated in paragraph 3.10.

B. Do not conduct paint removal if wind speeds at the job site are greater than 20-miles her hour unless paint removal is being accomplished by chemical methods. In addition, work must stop and cleanup of all debris must occur before any precipitation begins.

C. Do not leave debris on polyethylene or other parts of the work area overnight even if the work is not complete. Clean up all debris and contaminated polyethylene at the end of each shift.

3.4 CLEARANCE PRIOR TO PRIMER APPLICATION

A. Before primer application, a detailed visual inspection will be conducted by the Government representative for unprepared surfaces and visible dust. Any visible dust will be assumed to be lead contaminated. See paragraph 1.3.D. The work area including enclosure floors, walls, and ceiling shall be cleaned. If visible dust or unprepared surfaces are identified, the work area shall be re-cleaned and the inspection will be repeated. The outer enclosure shall remain intact and HEPA-filtered exhaust shall be maintained until final clearance air and inspection is conducted before enclosure removal as indicated in paragraph 3.10. Any personnel entering the work area are required to wear protective coveralls, head cover, gloves, and other necessary equipment including respirator until final clearance sampling of 3 $\mu g/m^3$ is obtained.

3.5 SAFETY

A. Ensure the safe passage of persons around the area of work. Comply with AEDC Safety Standard A6. Conduct operations to prevent injury to personnel and damage to existing equipment and structures.

3.6 UTILITIES

A. Do not interrupt existing utilities or commence power outages without written permission from the Government representative. Obtain an approved, AF Form 103, BCE Work Clearance, in accordance with AEDC Safety Standard B1, from the Government representative prior to interrupting utilities. Do not remove lead from active steam, electrical lines, or high-pressure lines. Wait for appropriate utility outages. Provide back flow prevention devices as required to prevent cross-contamination of water supplies.

3.7 COMMUNICATION DEVICES

A. Do not use any two-way communication devices unless pre-approved by the AEDC Security Forces.

3.8 WORK CLEARANCES

A. Obtain work clearances as required by AEDC Safety Standard B1. Perform hazard analysis to ensure all possible health hazards (e.g., toxic gases) have been evaluated and properly controlled. Before entering into a work space, make oxygen and Lower Explosive Limit (LEL) measurements using an NIOSH-approved 0_2/LEL metering device. While persons are working, designate a stand-by person, who has been trained within the last 12 months in cardiopulmonary resuscitation (CPR) by the American Red Cross or American Heart Association, to remain outside.

3.9 CLEAN-UP AND DISPOSAL

A. Clean-up: Maintain surfaces of the lead-control area free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint-removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA-filtered vacuum cleaner. Prevent ground contaminants by enclosing the work area as specified in paragraph 3.1.B. Pre-clean the ground or floor of visible paint chips and obvious visible lead contamination prior to enclosure construction to remove visible contamination already present in the work area.

B. Visual inspections: Visually inspect the work area after pre-cleaning and before placing any polyethylene sheeting. Re-clean and inspect any area where cleaning has not been adequately done before placing polyethylene sheeting. Inspect enclosures for adequacy prior to removing lead. Do not start abatement procedures prior to release by a Government industrial hygienist who will visually inspect the area for cleanliness and enclosure adequacy.

C. Inspection assistance: The designated lead-abatement supervisor shall assist in the visual inspection of all areas (enclosure areas cleaned, drums, trucks, and equipment used in lead abatement) as requested by the Government representative. This includes any inspection activity required.

D. Testing of lead-containing paint residue and used abrasive: Where indicated or when directed by the Government representative, test lead-containing paint residue and used abrasive in accordance with 40 CFR 261 and AEDC Safety Standard E18.

E. Non-hazardous debris disposal: Transport debris, rubbish, demolition waste, and other non-hazardous materials resulting from work from the site to the construction landfill which is located approximately 2 miles west of the intersection of Avenue E and 6th Street. Do not place edibles or garbage in the construction landfill; use existing dumpster boxes. Dispose of all material contaminated by lead as hazardous waste in compliance with AEDC Safety Standard E18.

F. Hazardous waste disposal:

1. Where hazardous waste (as identified or listed by 40 CFR 261) is generated, follow the procedures given in AEDC Safety Standard E18 for storing and turning in hazardous waste. These procedures include the requirement for completion of Forms GC-565 and GC-1337, which will be furnished by the Government representative.

Return the completed forms to the Government representative prior to transporting the drums to the accumulation point.

2. Collect lead-contaminated waste, scrap, debris, bags, containers, equipment, and clothing, which may produce airborne concentrations of lead particles.
3. Store removed paint, lead-contaminated clothing and equipment, and lead-contaminated dust and cleaning debris into U. S. Department of Transportation 49 CFR 178-approved 55-gallon drums which shall be provided by the contractor. Test the contents to determine the hazardous characteristics, and submit the test results to the Government representative as described in subparagraph 1 above. The contractor shall label and move the waste to a designated accumulation point in accordance with 40 CFR 262 and 49 CFR 172. The Government will be responsible for the further transportation and disposal of the waste.
4. Do not place any hazardous waste, as defined in 40 CFR 261, in any AEDC landfill.

3.10 LEAD ABATEMENT COMPLETION

A. Samples and tests: Do not remove protective barricades or enclosures until concurrence is received in writing from the Government representative. The Government representative will visually inspect the surfaces of both the enclosure and abated substrate for visible dust contamination, and the contractor shall re-clean all areas as required. Also see paragraph 1.3.D. Wipe and/or microvac samples will be collected to determine that the lead surface contamination does not exceed 500 $\mu g/ft^2$ of surface. If any wipe and/or microvac samples do not meet this criterion, re-clean the entire work area. If re-cleaning is required, monitor airborne lead concentrations during and after re-cleaning. Once the visual inspection has been made and wipe and/or microvac samples indicate clean surface levels, clearance air monitoring will be accomplished. If airborne lead concentrations exceed 3 $\mu g/m^3$, re-clean the area. Clearance monitoring will be repeated by the Government representative as necessary. HEPA-filtered air systems shall be operated continually until adequate clearance levels are met. In addition to air and wipe samples, soil, gravel, and water samples will be taken in the work area to determine that lead contamination in the area is no greater than 3.7 parts per million above pre-construction levels in soil and gravel or 100 parts per billion in water regardless of the pre-construction levels. Sample results below these limits are required before enclosures or barricades are removed. Shower water shall be sampled prior to disposal to ensure that the 100-parts-per-billion level is met. See paragraph 3.1.B.4. Analysis of air and wipe samples collected and tested by the Government representative may take 1-1/2 to 3 work days, with bulk and water analysis taking up to 5 work days. Keep the area sealed, barriers intact, and HEPA-filtered air exhaust ventilation in operation until the results of final air samples are received.

B. Work area inspection: The Government representative will visually inspect the general work area following enclosure removal to ensure the work area has been adequately cleaned and to ensure that no damage has been done to buildings, structures, or equipment.

END OF SECTION

SECTION 02220
DEMOLITION

PART 1 GENERAL

1.1 SUMMARY. The extent of demolition work is shown on the drawings. Demolition includes the complete removal and disposal of demolished materials, as shown on the drawings and specified herein. Demolish existing built-up roofing materials including vapor barrier, insulation, flashing and edge nailer, and mechanical items shown on the mechanical demolition drawing. Remove steel ladders as shown on drawings. Coordinate demolition of non-asbestos materials with demolition of asbestos and lead materials as specified in Sections 02080 and 02085 to provide concurrent demolition operations.

1.2 SUBMITTALS. Submit proposed methods and operations of demolition for approval prior to the start of work. Include in the schedule the coordination for continuation of building service as required. Identify the approach to the building that will be used for removal of demolished materials and the arrival of new materials.

PART 2 PRODUCTS - None

PART 3 EXECUTION

3.1 Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

3.2 Do not close or obstruct streets, walks, or other occupied or used facilities without concurrence from the Government representative. Provide alternative routes around closed or obstructed traffic ways.

3.3 Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent personal injury and damage to adjacent buildings or other facilities.

3.4 Repair damages caused to adjacent facilities by demolition operations at no cost to the Government.

3.5 Maintain existing utilities that are to remain, keep them in service, and protect against damage during demolition operations. Do not interrupt existing utilities serving occupied or used facilities except with the concurrence of the Government representative. Removal and reinstallation of existing roof-mounted equipment and power outages required to accomplish this work shall be coordinated with the Government representative.

3.6 Minimize the amount of dust and dirt rising and scattering in the air. Provide two 15-pound fire extinguishers, using ammonium phosphate fire-fighting agent, at roof and at grade level where demolition operations are being conducted.

3.7 Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to the condition existing prior to the start of the work.

3.8 Demolish existing construction where shown on the drawings, and remove from the site. Provide protective coverings as required to prevent damage to existing buildings, grounds, and equipment. Do not remove more existing roof material than can be replaced with new material in the same day. Remove debris, rubbish, and other materials resulting from demolition from the site each day and transport to the AEDC construction landfill located approximately 2.2 miles from the intersection of Sixth Street and Avenue E. (Do not place lead in the AEDC construction landfill. See Section 02085 for instructions on handling lead materials.)

END OF SECTION

SECTION 03300
CAST- IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cast-in-place concrete slabs.

1.2 REFERENCES

A. American Concrete Institute (ACI) Standard:
   1. COMP 27-00 Steel Fiber Reinforced Concrete.
   2. COMP 28-00 Synthetic and Other Non-Metallic Fiber Reinforcement of Concrete.
   3. 302.1R-96 Guide for Concrete Floor and Slab Construction.
   4. 308-97 Standard Practice for Curing Concrete.
   5. 544.1R-96 Fiber Reinforced Concrete.
   6. 544.2R-89 Measurement of Properties of Fiber Reinforced Concrete.

B. American Society for Testing and Materials (ASTM) Standard:
   1. A185-97 Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
   2. C94-00 Ready-Mixed Concrete.

1.3 COORDINATION

A. Coordinate work with other items listed in Section 01010.

1.4 SUBMITTALS

A. Fiber reinforcement submittals:
   1. Copies of fiber manufacturer's printed product data, clearly marked, to indicate proposed fibrous concrete reinforcement materials including application rate per cubic yard of concrete.
   2. Copies of certificates prepared by the concrete supplier stating approved fibrous concrete reinforcement materials were added to each concrete batch delivered to the project site, at the manufacturer's required minimum rate. Include trade name, manufacturer's name, and amount per cubic yard of fibrous reinforcement material added to each batch of concrete.
   3. Copies of fiber manufacturer's documentation showing 5-year satisfactory performance history on similar applications.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Mix and deliver concrete in accordance with ASTM C94.

B. Provide concrete to the following criteria: Compressive strength, 28 days: 3,000 psi.

C. Fiber reinforcement characteristics:
   1. Fiber content: The specific fiber manufacturer will dictate required fiber content. The percent of fiber in the concrete mix is based on volume and shown as a percent of the mix. Fiber contents from 1.7 percent to 2.7 percent maximum.
   2. Glass fibers: Glass fibers approved for use shall be 100 percent virgin polypropylene fibrillated, MD graded fibers containing no reprocessed olefin materials and specifically manufactured for concrete secondary reinforcement.

D. Fiber reinforcement application:
   1. Add fibrous concrete reinforcement to concrete materials at the time concrete is batched in amounts in accord with approved submittals for each type of concrete required.
   2. Mix concrete in strict accord with fiber reinforcement manufacturer's instructions and recommendations for uniform and complete distribution.

E. References:
   1. ACI 544.1R-96.
   2. ACI 544.2R-89.
   3. ACI COMP 27.
   4. ACI COMP 28.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify site conditions.

B. Verify that anchors, reinforcement and other items to be cast into concrete are accurately placed and positioned securely.

3.2 PLACING CONCRETE

A. Place concrete in accordance with ACI 302.1R.

B. Notify Government representative minimum 24 hours prior to commencement of placing operations.

C. Ensure reinforcement, embedded parts, and forms are not disturbed during concrete placement.

D. Place concrete continuously between pre-determined forms.

E. Screed slabs, maintain surface flatness of 3/16-inch per foot.

F. Provide a trowel finish for all new concrete.

3.3 CURING

A. Cure slab in accordance with ACI 308.

3.4 PATCHING

A. Allow Government representative to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Government representative upon discovery.

C. Patch imperfections as directed by the Government representative.

3.5 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Contracting Officer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Contracting Officer for each individual area.

END OF SECTION

SECTION 03370
CONCRETE CURING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Initial and final curing of concrete surfaces.

1.2 REFERENCES

A. American Concrete Institute (ACI) Standards:
   1. 301-99 Structural Concrete.
   2. 308-97 Standard Practice for Curing Concrete.

B. American Society for Testing and Materials (ASTM) Standard:
   1. C309-98 Liquid Membrane-Forming Compounds for Curing Concrete.

1.3 SUBMITTALS

A. Product data: Provide data on curing compound characteristics, compatibility and limitations.

B. Manufacturer's installation instructions: Indicate criteria for preparation and application of curing compounds.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301.

PART 2 PRODUCTS

2.1 MATERIALS

A. Membrane curing compound: ASTM C309, Type 1, Class A.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces are ready to be cured.

3.2 EXECUTION - HORIZONAL SURFACES

A. Cure concrete surfaces in accordance with ACI 308.

B. Apply membrane curing compound in accordance with the manufacturer's instructions in 2 coats with the second coat at right angles to the first.

3.3 PROTECTION OF FINISHED WORK

A. Protect finished work from damage prior to removing forms.

END OF SECTION

SECTION 03930
CONCRETE REHABILITATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes preparation of concrete and application of repair materials; rehabilitation of concrete surfaces. This work may require epoxy materials augmented with concrete materials, depending on requirements and extent of damage. The preferred solution requires the shortest drying time, for the progress of the project and the durability of the fix.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standards:
   1. C150-99 Portland Cement.
   2. C404-97 Aggregates for Masonry Grout.
   3. C882-99 Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
   4. D638-99 Tensile Properties of Plastics.
   5. D695-96 Compressive Properties of Rigid Plastics.
   6. D790-99 Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.3 SUBMITTALS

A. Product data: Product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

B. Manufacturer’s instructions: Mixing instructions.

C. Manufacturer's certificate: Certify products meet or exceed specified requirements.

1.4 QUALIFICATIONS

A. Materials manufacturer: Company specializing in manufacturing products specified in this section.

B. Applicator: Company specializing in concrete repair.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with instructions for storage, shelf life limitations, and handling.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

A. Epoxy Resin: Two-part epoxy adhesive containing 100 percent solids, meeting the following minimum characteristics:

	Characteristic	Test Method	Results
1.	Bond Strength	ASTM C882	2,700 psi
2.	Tensile Strength	ASTM D638	6,600 psi
3.	Elongation	ASTM D638	2 percent at 7 days 70ºF
4.	Flexural Strength	ASTM D790	8,000 psi
5.	Compressive Strength	ASTM D695	6,500 psi

B. Bonding agent: Polyvinyl acetate emulsion, dispersed in water while mixing, non-coagulant in mix, water resistant when cured.

C. Portland cement: ASTM C150, gray color.

D. Sand: ASTM C404; uniformly graded, clean.

E. Water: Clean and potable.

F. Cleaning Agent: Commercial muriatic acid appropriate strength.

2.2 MIXING EPOXY MORTARS

A. Mix epoxy mortars for purpose intended.

B. Mix components in clean equipment or containers. Conform to pot life and workability limits.

2.3 MIXING CEMENTITIOUS MATERIALS

A. Mix cementitious mortar for purpose intended.

B. Include bonding agent as additive to mix.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

A. Clean concrete surfaces of dirt, laitance, corrosion, or other contamination; wire brush using water and/or acid; rinse surface and allow to dry.

B. Flush out cracks and voids with chemical solvent, muriatic acid, or water to remove laitance and dirt. Chemically neutralize by rinsing with water.

C. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than depth of crack to be filled or port size diameter no greater than thickness of crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.

D. For areas patched with epoxy mortar, remove broken and soft concrete 1/4-inch deep. Clean surfaces mechanically; wash with acid; rinse with water.

3.3 REPAIR WORK

A. Repair exposed structural, shrinkage, and settlement cracks of concrete by epoxy injection, epoxy application, bonding agent, and/or cementitious paste method.

B. Repair spalling. Fill voids flush with surface.

3.4 APPLICATION - EPOXY MORTAR

A. Trowel apply mortar mix to required thickness to match existing level surface. Tamp into place filling voids at spalled areas.

B. For patching honeycomb, trowel mortar onto surface, work mortar into honeycomb to bring surface flush with surrounding area. Finish trowel surface to match surrounding area.

C. Cover exposed steel reinforcement with epoxy mortar, feather edges to flush surface.

3.5 APPLICATION - CEMENTITIOUS MORTAR

A. Apply roller coating of bonding agent to damp concrete surfaces. Provide full surface coverage.

B. Apply cementitious mortar by steel trowel to required thickness to match existing surrounding area. Tamp into place filling voids at spalled areas. Work mix into honeycomb.

C. Damp cure cementitious mortar for four days.

END OF SECTION

SECTION 05312
STEEL ROOF DECK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Steel roof deck and accessories.
2. Formed steel cant strips and eave strips.
3. Bearing plates and angles.

B. Related Sections:
1. Section 03300 - Cast-in-Place Concrete:

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standards:
1. A36-00 Carbon Structural Steel.
2. A653-00 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip process.

B. American Welding Society (AWS) Standard:
1. D1.1-00 Structural Welding Code.

C. Steel Deck Institute (SDI) Standard:
1. Design Manual for Composite Decks, Form Decks, Roof Decks, Cellular Metal Floor Deck with Electrical Distribution, 1989.

D. Steel Structures Painting Council (SSPC) Standard:
1. Paint 15-91 Steel Joist Shop Paint Type I, Red Oxide Paint Type II, Asphalt Coating.

1.3 PERFORMANCE REQUIREMENTS

A. Design metal deck in accordance with SDI Design Manual.

B. Calculate to structural working stress design and maximum vertical deck deflection of 1/180.

1.4 SUBMITTALS

A. Shop drawings: Indicate deck plan, support locations, projections, pertinent details, and accessories.

B. Product data: Deck profile characteristics and dimensions, structural properties, finishes.

C. Manufacturer's installation instructions.

D. Manufacturer's certificates: Certify products meet or exceed specified requirements.

E. Welding qualifications: Qualify welders and weld procedures in accordance with AWS D.1.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section.

B. Design deck layout, spans, fastening, and joints, under direct supervision of Professional Engineer experienced in design of this work and licensed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturers:
1. United Steel Deck.
2. Vulcraft Steel Deck.
3. Wheeling Corrugating Co.
4. Approved equal.

B. Sheet steel: ASTM A653, Grade B Structural Quality; with G90 galvanized coating conforming to ASTM A653.

C. Bearing plates, angles: ASTM A36 steel, unfinished.

D. Welding materials: AWS D1.1.

E. Shop and touch-up primer: SSPC Paint 15, Type 1, red oxide.

2.2 FABRICATION

A. Metal deck: Sheet steel, configured as follows:
1. Minimum metal thickness excluding finish: 20 gauge.
2. Nominal height: 1-1/2 inch, fluted profile to SDI.
3. Formed sheet width: 32 inch.
4. Side joints: Lapped.

5. Flute sides: Diagonally ribbed for improved concrete bond.

B. Related deck accessories: Metal closure strips, wet concrete stops, cant strips, 20-gauge thick galvanized sheet steel; of profile and size as indicated on drawings.

C. Cant strips: Formed sheet steel, 20-gauge thick, 45 degree slope, 3-1/2-inch nominal width and height, flange for attachment.

D. Weld washers: Mild steel, uncoated, 3/4-inch outside diameter, 1/8-inch thick.

PART 3 EXECUTION

3.1 INSTALLATION

A. Erect metal deck in accordance with SDI Manual.

B. Bear deck on steel supports with 3-inch minimum bearing. Align and level.

C. Fasten deck to steel support members at ends and intermediate supports with fusion welds through weld washers at 12 inches on center maximum, parallel with deck flute and at each transverse flute.

D. Weld in accordance with AWS D1.1.

E. Weld male/female side laps at 18 inches on center maximum.

F. Install wet concrete stops at roof edge upturned to top surface of slab to contain wet concrete. Install stops of sufficient strength to remain stationary under wet concrete without distortion.

G. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.

H. Place metal cant strips in position and fusion weld.

I. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up prime paint.

END OF SECTION

PART 1. GENERAL

1.1 SECTION INCLUDES

A. Load bearing formed steel stud interior wall, and support framing.

B. Formed steel joist, slotted channel, framing, and bridging.

1.2 CODES AND STANDARDS

A. American Society for Testing and Materials (ASTM) StandardS:

1.	A123 REV A-99	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
2.	A653-00	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3	C955-00	Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Applications of Gypsum Panel Products and Metal Plaster Bases.

B. American Welding Society (AWS), Inc. Standards:

1.	D1.1-00	Structural Welding Code.
2.	D1.3-98	Structural Welding Code - Sheet Steel.

C. Steel Structures Paint Council (SSPC) Standard:

1.	Paint 20-91	Zinc-rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.3 SUBMITTALS

A. Product data: Provide data and engineering analysis on standard framing members; describe materials and finish, product criteria, and limitations.

B. Manufacturer’s installation instructions: Indicate special procedures and perimeter conditions requiring special attention.

C. Welding procedures and welder qualifications.

PART 2 PRODUCTS

2.1 FRAMING MATERIALS

A. Studs: ASTM C955, formed to channel shape, punched web; 20-gauge thick, 1-1/2-inch face, 3-5/8-inch and 6-inch depth.

B. Joists: ASTM A653, sheet steel, formed to channel shape, punched web; 14-gauge thick, 2-1/2-inch face, 8-inch and 10-inch depth.

C. Track: Formed steel; channel shaped; same width as studs, tight fit; 22 gage thick, solid web.

2.2 ACCESSORIES

A. Bracing, bridging: Formed sheet steel, thickness determined for conditions encountered.

B. Plates, clips: Formed sheet steel, thickness determined for conditions encountered.

C. Touch-up primer for galvanized surfaces: SSPC Paint 20 Type I Inorganic zinc rich.

2.3 FASTENERS

A. Self-drilling, self-tapping screws, bolts, nuts and washers: ASTM A123, hot dip galvanized to 1.25 oz/sq ft.

B. Anchorage devices: Drilled expansion bolts, and screws with sleeves.

C. Welding: In conformance with AWS D1.1 and AWS D1.3.

2.4 FABRICATION

A. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

PART 3 EXECUTION

3.1 ERECTION OF STUDDING

A. Install components in accordance with manufacturer’s instructions.

B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches.

C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side openings. Connect studs to tracks using fastener method.

D. Double stud wall openings and window jambs.

E. Erect load bearing studs one piece full length. Splicing of studs is not permitted.

F. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.

G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

H. Install intermediate studs above and below openings to align with wall stud spacing.

I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

J. Attach furring channels to studs for attachment of fixtures anchored to walls.

K. Install framing between studs for attachment of mechanical and electrical items and to prevent stud rotation.

L. Touch-up field welds and damaged galvanized surfaces with primer.

3.3 ERECTION OF JOISTS

A. Install framing components in accordance with manufacturer's instructions.

B. Make provisions for erection stresses. Provide temporary alignment and bracing.

C. Place joists at 16 inches on center; not more than 2 inches from abutting walls. Connect joists to supports using fastener and welding method and as indicated.

D. Set roof joists parallel and level, with lateral bracing and bridging.

E. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.

F. Provide web stiffeners at reaction points.

G. Touch-up field welds and damaged galvanized surfaces with primer.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated ferrous metal.

1.2 RELATED SECTIONS

A. Section 09900: Painting

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM) Standard:
   1. A36-00 Carbon Structural Steel
   2. A500-99 Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

B. American welding Society, Inc. (AWS) Standard:
   1. A2.4-98 Symbols for Welding, Brazing and Nondestructive Examination.
   2. D1.1-00 Structural Welding Code-Steel.

1.4 SUBMITTALS

A. Shop drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details.

B. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welding procedures and welder qualifications.

1.5 QUALIFICATIONS

A. Qualification of welders and qualification of weld procedures. Qualify welders and procedures in accordance with the applicable requirements of AWS D1.1. Perform no welding before receiving Contracting Officer’s approval of welder certifications and weld procedure qualifications.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

A. Plates and angles: ASTM A36 mild carbon steel.

B. Welding materials: AWS D1.1 structural tube shapes and rounds, ASTM A500 structural tubing, type required for materials being welded in accordance with AWS D1.1.

2.2 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings.

D. Perform field structural welding in accordance with AWS D1.1.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

END OF SECTION

SECTION 05810
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.1 GENERAL

A. This Section includes the following:
   1. Floor expansion joint cover assemblies.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standard:
   1. B209-00 Aluminum and Aluminum-Alloy Sheet and Plate.
   2. B221-96 Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.

1.3 SUBMITTALS

A. Product data: Manufacturer's product specifications, installation instructions, and general recommendations for each type of expansion joint cover assembly indicated.

B. Shop drawings: Show full extent of expansion joint cover assemblies; include large-scale details indicating profiles of each type of expansion joint cover assembly, splice joints between sections, joinery with other types, special end conditions, anchorage, fasteners, and relationship to adjoining work and finishes. Include description of materials and finishes.

C. Samples: For each type of metal finish indicated on metal of same thickness and alloy to be used in work. Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing limits of such variations.

1.4 QUALITY ASSURANCE

A. Manufacturer's instructions: In addition to requirements of these specifications, comply with manufacturer's instructions recommendations for all phases of work, including preparation of substrate, applying materials, and protection of installed units.

B. Single-source responsibility: Obtain expansion joint cover assemblies from one source from a single manufacturer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Available manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include but are not limited to the following:
   1. C/S Group Expansion Joint System
   2. Architectural Art Mfg., Inc.
   3. Balco, Inc.
   4. D. S. Brown Co.
   5. CLD Industries
   6. Construction Specialties, Inc.
   7. E-Poxy Industries, Inc.
   8. Erie Metal Specialties
   9. Metalines, Inc.
   10. MM Systems Corp.
   11. Michael Rizza Co., Inc.
   12. Watson Bowman Acme Corp.
   13. Approved Equal.

2.2 MATERIALS

A. Metals:
   1. Aluminum: ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 6061-T6, sheet and plate.
      a. Protect aluminum surfaces in contact with cementitious materials with zinc chromate primer or chromate conversion coating.

B. Accessories: Manufacturer's standard anchors, fasteners, set screws, spacers, flexible vapor seals and filler materials, drain tubes, adhesive, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.3 FABRICATION

A. General: Provide expansion joint cover assemblies of design, basic profile, materials, and operation indicated. Select units comparable to those indicated or required to accommodate joint size, variations in adjacent surfaces, and structural movement. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline-mitered corners where joint changes directions or abuts other materials. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint cover assemblies.

B. Metal joint cover assemblies: Provide continuous extruded metal frames of profile indicated with seating surface and flush floor rim to accommodate flooring and concealed bolt and steel anchors for embedment in concrete. Provide assemblies formed to receive cover plates of design indicated and to receive filler materials between raised rim of frame and edge of plate. Furnish depth and configuration to suit type of construction and to produce a continuous flush-wearing surface with adjoining finish floor surface.
   1. Floor-to-floor joints: Provide a floor-to-floor joint to match or equal C/S Group Expansion Joint Systems' "Allway Expansion Joint" #ALR-100 or approved equal.
   2. Provide floor cover plate.

2.4 METAL FINISHES

A. General: Apply finishes in factory after products are fabricated. Protect finishes on exposed surfaces with protective covering before shipment.

B. Aluminum finishes:
   1. Clean anodized finish: Medium matte etched finish with 0.7-mil minimum thick anodic coating.
   2. Factory-primed concealed surfaces: Protect concealed metal surfaces that will be in contact with concrete and masonry surfaces when installed by applying a shop coat of manufacturer's standard primer to contact surfaces. Provide minimum dry film thickness of 2.0 mils.

PART 3 EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, templates, and instructions for installation of expansion joint cover assemblies.

3.2 INSTALLATION

A. Fastening to in-place construction: Provide anchorage devices and fasteners where necessary for securing expansion joint cover assemblies to in-place construction, including threaded fasteners with drilled-in expansion shields concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and provide for secure attachment of expansion joint cover assemblies.

B. Cutting, fitting and placement: Perform all cutting, drilling, and fitting required for installation of expansion joint covers. Install joint cover assemblies in true alignment and proper relationship to expansion joints and adjoining finished surfaces measured from established lines and levels. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.

Set floor covers at elevations to be flush with adjacent finished floor materials. Locate roof covers in continuous contact with adjacent surfaces. Securely attach in place with all required accessories. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches on centers.

C. Joinery and continuity: Maintain continuity of expansion joint cover assemblies with end joints held to a minimum and metal members aligned mechanically using splice joints. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

3.3 CLEANING AND PROTECTION

A. Do not remove strippable protective material until finish work in adjacent areas is complete. When protective material is removed, clean exposed metal surfaces to comply with manufacturer's instructions.

END OF SECTION

SECTION 07213
BLANKET INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Blanket insulation in roof construction.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standard:
1. C665-95 Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

1.3 SUBMITTALS

A. Product data: Provide data on product characteristics, performance criteria, and limitations.

B. Manufacturer's certificate: Certify that products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Blanket insulation: Metal building R-33, meeting the requirements of C665, Type I, preformed glass roll with reflective membrane one side.

B. Tape: Bright aluminum Polyethylene self-adhering type, mesh-reinforced, 2 inches wide.

PART 3 `EXECUTION

3.1 EXAMINATION

A. Verify site conditions.

B. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

A. Install insulation in accordance with manufacturer's instructions, after all other work in roof area is complete.

B. Trim insulation neatly to fit spaces.

C. Fit insulation tightly in spaces and tightly to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids.

D. Install with factory-applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.

E. Tape in place.

F. Tape-seal butt ends, lapped flanges, and tears or cuts in membrane.

G. Place insulation fasteners at 6 inches on center.
   1. Avoid installation practices that allow the insulation to become continually wet, which can cause inside out corrosion.

END OF SECTION

SECTION 07591
PREPARATION FOR REROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes removal of existing roofing system in preparation for new standing seam roof.

B. Provide interim weatherproof membrane roof consisting of two layers of 30 pound felt, with hot mopped asphaltic bonding between layers, approximately 1-1/4 gal/100 sf.

C. Removal will be staged to minimize exposure to the weather.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standard:
1. C208-95 Cellulosic Fiber Insulating Board.

1.3 SYSTEM DESCRIPTION

A. Remove entire roof area in staged tear-offs: Remove existing roofing gravel, perimeter flashings, base flashings, counter flashings, vent stack flashings, roofing membrane, insulation, vapor retarder, air barrier, sheathing, and damaged deck. The increments are determined by amount of work that can be completed in a dry period without rain or overnight condensation.

1.4 SUBMITTALS

A. Provide schedule for roof tear-off and scheduled roof replacement for weather proofing during construction.

1.5 QUALIFICATIONS

A. Materials removal firm: Company specializing in performing work of this section.

16 PRE-INSTALLATION MEETINGS

A. Convene minimum one week prior to commencing work of this section.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not remove existing roofing membrane when weather conditions threaten integrity of building contents or intended continued occupancy.

B. Maintain continuous temporary protection prior to and during installation of new roofing system to keep building weather tight.

1.8 SCHEDULING

A. Schedule work to coincide with commencement of installation of new roofing system.

1.9 COORDINATION

A. Remove only existing roofing materials being replaced with new materials same day and as weather permits.

B. Coordinate work with other affected mechanical and electrical work associated with roof penetrations.

PART 2 PRODUCTS

2.1 COMPONENTS

A. Temporary protection: Sheet fiber reinforced plastic, furnish weights to retain sheeting in position. (Only a temporary measure, not in place of Item 2.1B.)

B. Two layers 30 pound felt with hot mopped asphaltic bonding between layers.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing roof surface is clear and ready for work of this section.

3.2 PREPARATION

A. Sweep roof surface clean of loose matter.

B. Remove loose refuse and dispose to appropriate land fill per instructions of Government representative.

3.3 EXISTING CONSTRUCTION

A. Remove metal fascia.

B. Scrape roofing gravel from membrane surface.

C. Remove roofing membrane, perimeter base flashing, flashing around roof protrusions, pitch pans, and pockets.

D. Remove insulation cant strips, and blocking.

E. Remove vapor retarder.

F. Remove damaged deck materials.

G. Repair concrete deck surface to provide smooth working surface for new roof system.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit traffic over unprotected or repaired deck surface.

3.5 SCHEDULES

A. Provide demolition in preparation of interim roof.

B. Provide interim weather proofing over prepared concrete deck as defined earlier.

C. Provide roof supporting system per Section 07610.

D. Provide new standing seam roof per Section 07610.

END OF SECTION

SECTION 07610
STANDING SEAM SHEET METAL ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes pre-engineered, pre-finished galvalume, roll formed sheet steel roofing, associated flashing, underlayment and ridge vents.
   1. Provide integral gutters, downspouts, fascias, vented soffits, louvers, and counter-flashing.
   2. Provide Kynar 500 finish on all integral components (color to be selected).

1.2 REFERENCES

A. American Architectural Manufacturers Association (AAMA) Standards:
   1. 603.8-92 Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extrusions Aluminum.

B. American Institute of Steel Construction (AISC) Standard:
   1. M018L-94 Manual of Steel Construction Load and Resistance Factor Design Structural Members, Specifications, and Codes.
   2. M010L-94 Manual of Steel Construction Load and Resistance Factor Design Volume II Connections.

C. American Society for Testing and Materials (ASTM) Standards:
   1. A653-00 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. A924-99 General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
   3. D226-97 Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

D. Sheet Metal and Air Conditioning Contractors (SMACNA) Standard:
   1. Architectural Sheet Metal Manual, 1993.

1.3 SUBMITTALS

A. Shop drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashing, terminations, and installation details.

B. Product data: Data on metal types, finishes, characteristics, sealant, roof support system, fasteners for roof support system, roof support anchors, and roof flashing.

C. Samples:
   1. Two samples 12- by 12-inch in size illustrating metal roofing mounted on plywood backing illustrating typical seam, external corner, internal corner, valley, ridge, junction to vertical dissimilar surface, material, and finish, include panel clip system.
   2. Two samples 12- by 12-inch in size illustrating metal finish color.

D. Engineering data: Confirm requirements of support members, fasteners, and anchors in accordance with design loads, wind uplift, and design pressure requirements.

E. Warranties:
   1. Twenty-year manufacturer's warranty for the roofing system, ensuring against leakage into the insulation and the building and ensuring coating integrity and protection against excessive color change and chalking.
   2. Warranty shall commence on date of substantial completion.
   3. Installer shall provide manufacturer with two-year warranty covering roofing system installation and water-tightness.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise noted.

B. Maintain one copy of each document on site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery:
   1. Protect components during fabrication and packing from mechanical abuse, stains, discoloration, and corrosion.
   2. Provide protective interlining between contact areas of exposed surfaces to prevent abrasion during shipment, storage, and handling.

B. Storage:
   1. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
   2. Store materials off ground providing for drainage; under cover providing for air circulation; and protected from wind movement, foreign material contamination, mechanical damage, cement, lime, or other corrosive substances.
   3. Handle materials to prevent damage to surfaces, edges and ends of roofing sheets and sheet metal items. Damaged material shall be rejected and removed from the site.
   4. Protect panels from wind-related damages.

5. Inspect materials upon delivery. Reject and remove physically damaged or marred material from project site.

C. Protection:
1. Prevent contact with materials causing discoloration or staining.
2. Provide protection or avoid traffic on completed roof surfaces.
3. Do not overload roof with stored materials.
4. Support no roof-mounted equipment directly on roofing system.

D. Ascertain that work of other trades which penetrates the roof or is to be made watertight by the roof is in place and approved prior to installation of roofing.

1.6 WARRANTY

A. Provide a statement from the manufacturer that manufacturer's representative will inspect the project throughout the project duration and will furnish a 20-year warranty to the Government based on installation by the contractor.

PART 2 PRODUCTS

2.1 STANDING SEAM SHEET METAL ROOFING

A. Pre-finished galvanized steel sheet: ASTM A924, Grade A, or ASTM A653, G90 (Z275) zinc coating; 0.02 inch, 24 gage core steel, shop pre-coated with PVDF (polyvinylidene fluoride) coating; color as selected from manufacturer's standard color.

B. Interface between panel and clip shall provide for unlimited thermal movement in each direction along the longitudinal direction.

C. Provide all components of roof system from a single manufacturer.

D. Provide standing seam 16-inch on center panel width.

2.2 ACCESSORIES

A. Concealed fasteners: Same material and finish as roofing metal with soft neoprene washers. Exposed fasteners or mastic not allowed.

B. Underlayment: ASTM D226, organic roofing felt, Type II, No. 30.

C. Sealant: Silicone type.

D. Solder: Not allowed.

E. Flashing and counter flashing to match the color of the metal roof.

F. Splash pads: Precast concrete type, minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

2.3 ROOF SUPPORT SYSTEM

A. Provide support members, fasteners, and anchors in accordance with AISC M018L and M019L design loads, wind uplift, and design pressure requirements.

B. Provide pre-painted or rust resistant materials and components.

C. Provide manufacturer's standard components.

D. Conform to building’s existing structural system.

E. Anchors, fasteners, as required for anchorage to existing concrete deck, self-drilling of plated carbon steel with 300 series stainless steel capped head.

2.4 FABRICATION

A. Form sections accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, to interlock with sheet.

C. Form pieces in single length sheets.

D. Hem exposed edges on underside 1/2-inch, miter and seam corners.

E. Form material with standing seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Remove Metal filings, drillings, pop rivet stems, and fasteners daily. Avoid walking on them to prevent damage to the paint film.

2.5 FACTORY FINISHING

A. PVDF (polyvinylidene fluoride) coating: High performance organic finish, AAMA 603.8, multiple coat, thermally cured fluoropolymer finish system.

B. Primer coat: Finish concealed side of metal sheets with primer compatible with finish system as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to eaves.

B. Verify deck is dry.

C. Verify roof openings, pipes, sleeves, ducts, or vents through roof are solidly set, and nailing strips located.

D. Verify roofing termination and base flashing are in place, sealed, and secure.

3.2 PREPARATION

A. Fill holes and surface cracks with latex filler at areas of bonded eave protection.

B. Broom clean deck surfaces under eave protection and underlayment.

C. Install starter and edge strips, and cleats before starting installation.

D. Back paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

A. Eave (Ice Dam) protection: Place eave edge metal flashing tight with fascia boards. Weather lap joints 2 inches and seal with plastic cement. Secure flange with nails.
   1. Apply eave protection sheet.
   2. Apply 4-inch wide band of plastic cement over deck flange of eave edge flashing, and embed 18-inch wide strip of eave protection sheet. Place starter strip with eave edge flush with face of flashing. Secure in place. Lap ends minimum 6 inches.
   3. Apply plastic cement at rate of approximately 1-1/4 gal/100 sq ft over starter strip.
   4. Starting from lower edge of starter strip, lay additional 36-inch wide strips of eave protection sheet in plastic cement, to produce two ply membrane. Weather lap plies minimum 19 inches and nail in place. Lap ends minimum 6 inches. Stagger end joints of each consecutive ply.
   5. Extend eave protection sheet minimum 4-feet upslope beyond interior face of exterior wall.

B. General roofing installation requirements:
   1. Apply underlayment over entire roof area in 2 layers; first layer laid parallel to slope with joints lapped 6 inches, second layer laid perpendicular to slope with 2-inch lapped edges. Minimize nail quantity.
   2. Apply slip sheet in one layer, laid loose.
   3. Cleat and seam joints.

4. Use plastic cement for joints between metal and bitumen and for joints between metal and felts.
5. Provide formed metal pans for protrusions through roof. Fill pans watertight with plastic cement.
6. Provide integral gutters, downspouts, fascias and soffits.

C. Standing seam roofing installation:
1. Conform to SMACNA details.
2. Space standing seams at 16-inch on center.
3. Lay sheets with long dimension perpendicular to eaves. Apply pans beginning at eaves.
4. Lock cleats into seams and flatten.
5. At eaves, terminate roofing by hooking over edge strip.
6. Finish standing seams 1-inch high on flat surfaces.
7. Bend up one side edge 1-1/2 inches and other edge 1-3/4 inches.
8. Make first fold 1/4-inch wide single fold and second fold 1/2-inch wide, providing locked portion of standing seam, 5 plies in thickness.
9. Fold lower ends of seams at eaves over at 45-degree angle.
10. Terminate standing seams at ridge and hips by turning down with tapered fold.
11. Form valleys of sheets not exceeding 10 feet in length. Lap joints 6 inches in direction of drainage.
12. Extend valley sheet minimum 6 inches under roofing sheets.
13. At valley, double fold valley and roofing sheets and secure with cleats spaced 16 inches on center.

D. Gutters and downspouts installation.
1. Conform to SMACNA details.
2. Secure gutter lining to substrate with cleats spaced minimum 24 inches on center along edges of gutters.
3. Longitudinal joints not acceptable.
4. At roof edges, extend gutter lining under metal roofing 6 inches minimum and terminate in 3/4-inch folded edge secured by cleats. Hook lower end of roofing into lock strip to form 3/4-inch wide loose-lock seam.
5. Seal gutters watertight. Seal joint of gutter to drain with sealant.
6. Connect downspouts to boots shoes at 6 inches above grade. Seal connection watertight.
7. Set splash pads under downspouts. Secure in place.

E. Flashing installation:
1. Secure flashings in place using concealed fasteners.
2. Cleat and seam joints.
3. Apply plastic cement compound between metal flashing and felt flashing.
4. Fit flashing tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
5. Seal metal joints watertight.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit traffic over unprotected roof surface.

B. Remove strippable film immediately after installation of panels.

END OF SECTION

SECTION 07900
JOINT SEALERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparing substrate surfaces.

B. Sealant and joint backing.

C. Sealant and caulking.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standards:
   1. C834-95 Latex Sealants.
   2. C920-98 Elastomeric Joint Sealants.

1.3 SUBMITTALS

A. Product data: Furnish data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

PART 2 PRODUCTS

2.1 SEALANTS

A. Acrylic Emulsion Latex (Type C): ASTM C834, single component, color to be selected.

B. Silicone Sealant (Type I): ASTM C920, Class A, single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding; color to be selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

3.2 PREPARATION

A. Remove loose materials and foreign matter which might impair adhesion of sealant.

B. Clean joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions.

D. Protect elements surrounding the work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.

B. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

C. Ensure a smooth wiped finish.

3.4 CLEANING

A. Clean adjacent soiled surfaces.

END OF SECTION

SECTION 08114
STANDARD STEEL DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes non-rated, steel doors.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standard:
1. A653-00 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. Steel Door Institute (SDI) Standard:
1. A250.8-98 Steel Doors and Frames.

1.3 SUBMITTALS

A. Shop drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing and finishes.

B. Product data: Door configurations, location of cut-outs for hardware reinforcement.

C. Samples: Two samples of door face metal, 12-inch by 12-inch in size illustrating shop finish colors and surface texture.

D. Manufacturer's installation instructions: Special installation instructions.

E. Manufacturer's certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with SDI A250.8.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section.

B. Installer: Company specializing in performing work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept doors on site in manufacturer's packaging. Inspect for damage.

B. Break seal on site to permit ventilation.

1.7 COORDINATION

A. Coordinate work with door opening construction, door frame, and door hardware installation.

PART 2 PRODUCTS

2.1 STANDARD STEEL DOORS

A. Manufacturers:
1. Amweld Building Products, Inc.
2. Ceco Door Products.
3. Kewanee Corp.
4. Pioneer Industries.
5. Republic Builders Products.
6. Steelcraft.
7. Approved equal.

B. Product description:
1. Exterior doors insulated: SDI A250.8, 1-3/4-inch thick.
   a. Level 2 - Heavy Duty, Model 1, full flush design.

2.2 COMPONENTS

A. Face: Steel sheet in accordance with SDI A250.8.

B. End closure: Channel, 0.04-inch thick, flush.

C. Core: Steel channel grid.

2.3 ACCESSORIES

A. Removable stops: Rolled steel, channel shape, mitered corners; prepared for countersink style screws.

B. Astragals for double doors: Steel, T shaped, specifically for double doors.

C. Primer: Zinc chromate type.

2.4 FABRICATION

A. Fabricate doors with hardware reinforcement welded in place.

B. Attach astragal to inactive leaf of pairs of doors.

C. Configure exterior doors with edge profile to receive recessed weather-stripping.

2.5 SHOP FINISHING

A. Steel sheet: Galvanized to ASTM A653.

B. Primer: Baked.

C. Shop finish: Baked enamel, color to match roof color.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install doors in accordance with SDI A250.8.

B. Coordinate installation of glass and glazing specified in Section 08800.

C. Coordinate installation of doors with installation of frames specified in Section 08115 and hardware specified in Section 08710.

D. Touch-up damaged shop finishes.

3.3 ERECTION TOLERANCES

A. Maximum Diagonal Distortion: 1/16-inch measured with straight edge, corner to corner.

3.4 ADJUSTING

A. Adjust door for smooth and balanced door movement.

END OF SECTION

SECTION 08115
STANDARD STEEL FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes non-rated steel frames.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standard:
1. A653-00 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. Steel Door Institute (SDI) Standard:
1. A250.8-98 Steel Doors and Frames.

1.3 SUBMITTALS

A. Shop drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.

B. Product data: Frame configuration and finishes.

C. Samples: Two samples of frame, 12-inch by 12-inch in size illustrating factory finished frame colors and surface texture.

D. Manufacturer's installation instructions: Submit special installation instructions.

E. Manufacturer's certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Conform to requirements of SDI A250.8.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept frames on site in manufacturer's packaging. Inspect for damage.

B. Break seal on-site to permit ventilation.

1.7 COORDINATION

A. Coordinate work with frame opening construction, door, and hardware installation.

PART 2 PRODUCTS

2.1 STANDARD STEEL FRAMES

A. Manufacturers:
1. Amweld Building Products, Inc.
2. Ceco Door Products.
3. Dunbarton Corp.
4. Kewanee Corp.
5. Republic Builders Products.
6. Steelcraft] Model.
7. Approved equal.

B. Product description: Standard shop fabricated steel frames non-rated types.
1. Frames: To suit SDI A250.8 Grade and Model of door specified in Section 08114.
2. Exterior frames:
a. Level 2 for door Model 1, nominal 16-gage/0.053-inch thick material, base metal thickness.

2.2 ACCESSORIES

A. Removable stops: Rolled steel shape, mitered corners; prepared for countersink style screws.

B. Primer: Zinc chromate type.

C. Silencers: Resilient rubber set in steel channel.

D. Weather-stripping: Resilient rubber set in steel retainer.

2.3 FABRICATION

A. Fabricate frames as welded unit.

B. Mullions for double doors: Removable type, of same profiles as jambs.

C. Fabricate frames with hardware reinforcement plates welded in place.

D. Prepare frames for silencers. Provide three single silencers for single doors and mullions of double doors on strike side.

E. Configure exterior frames with special profile to receive recessed weather-stripping.

2.4 SHOP FINISHING

A. Steel Sheet: Galvanized to ASTM A653.

B. Primer: Baked.

C. Factory finish: Baked enamel to match roof color.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install frames in accordance with SDI A250.8.

B. Coordinate installation of glass and glazing specified in Section 08800.

C. Coordinate installation of frames with installation of hardware specified in Section 08710 and doors in Section 08114.

3.3 ERECTION TOLERANCES

A. Maximum diagonal distortion: 1/16-inch measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08710
DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes hardware for steel doors.
   1. Provide door gaskets, including weather-stripping and seals, and thresholds.
   2. Provide lock set with out cylinder, with cylinder hole compatible to receive a 1-1/8-inch diameter Lloyd-Matheson Company 951 series, 7 pin, and regular cam cylinder.
   3. The Government will furnish and install cylinders after completion of contract.

1.2 REFERENCES

A. Builders Hardware Manufacturers Association (BHMA) Standards:
   1. A156 Complete Set of 24 BHMA Standards (A156 Series) with Binder.
   2. A156.1-97 Butts and Hinges.
   3. A156.4-92 Door Controls - Closures.
   4. A156.7-97 Template Hinge Dimensions.
   5. A156.13-94 Mortise Locks and Latches.
   6. A156.18-93 Materials and Finishes

1.3 SUBMITTALS

A. Shop drawings:
   1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts.
   2. Manufacturer's parts lists and templates.

B. Samples:
   1. One sample of typical hinge, lock-set, closer, and threshold, illustrating style, color, and finish.
   2. Approved samples may be incorporated into work.

C. Manufacturer's installation instructions: Special procedures, and perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with the following requirements: BHMA A156 series.

B. Maintain one copy of each document on site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually with necessary fasteners, instructions, and installation templates.

1.6 WARRANTY

A. Furnish two-year manufacturer warranty for lock-sets and door closers.

PART 2 PRODUCTS

2.1 DOOR HARDWARE COMPONENTS

A. General hardware requirements: Where not specifically indicated, comply with applicable BHMA A156 standard for type of hardware required. Furnish each type of hardware with accessories as required for applications indicated and for complete, finished, operational doors.
   1. Templates: Furnish templates or physical hardware items to door and frame manufacturers sufficiently in advance to avoid delay in Work.
   2. Reinforcing units: Furnished by door and frame manufacturers; coordinated by hardware supplier or hardware manufacturer.
   3. Fasteners: Furnish as recommended by hardware manufacturer and as required to secure hardware.
      a. Finish: Match hardware item being fastened.

B. Hinges: BHMA A156.1, full mortise type, and template type, BHMA A156.7, complying with following general requirements unless otherwise scheduled.
   1. Widths: Sufficient to clear trim projection when door swings 180 degrees.
   2. Number: Furnish minimum three hinges to 90 inches high, for each door leaf.
   3. Size and weight: 4-1/2-inch heavy weight typical for 1-3/4-inch doors.
   3. Pins: Furnish nonferrous hinges with non-removable pins (NRP) at exterior and locked out swinging doors.
   4. Tips: Flat button tips with matching plug.

C. Lock-sets: Furnish lock-sets compatible with specified cylinders. Typical 2-3/4-inch back-set. Furnish standard strikes with extended lips to protect trim from being marred by latch bolt, verify type of cutouts provided in metal frames.
   1. Mortise lock-sets: BHMA A156.13, Series 1000, Grade 1 unless otherwise indicated.

D. Closers: BHMA A156.4 modern type with cover, surface mounted closers; full rack and pinion type with steel spring and non-freezing hydraulic fluid.
   1. Adjustability: Furnish controls for regulating closing, latching, speeds, and back checking.
   2. Arms: Type to suit individual condition; parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.
   3. Location: Mount closers on inside of exterior doors, room side of interior doors typical.
   4. Operating pressure: Maximum operating pressure as follows.
      a. Interior doors: Maximum 5 pounds.
      b. Exterior doors: Maximum 8.5 pound.
   5. Thresholds: Maximum 1/2-inch height.
   6. Wall stops: BHMA A156.1, Grade 1, 2-1/2-inch wall stop, convex pad, with no visible screws.

2.2 FINISHING

A. Finishes: BHMA A156.18; furnish following finishes except where otherwise indicated in Schedule at end of section.
   1. Hinges: BHMA 626, Satin Bronze.
   2. Exterior door hardware: BHMA 613, Satin Bronze.
   3. Closers: BHMA 600, primed for painting.
   4. Thresholds: BHMA 613, Satin Bronze.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings and instructed by manufacturer.

3.2 INSTALLATION

A. Coordinate mounting heights with door and frame manufacturers. Use templates provided by hardware item manufacturer.

B. Mounting heights from finished floor to centerline of hardware item: Comply with manufacturer recommendations and applicable codes where not otherwise indicated.
   1. Locksets: 38 inch.
   2. Top hinge: Jamb manufacturer’s standard, but not greater than 10 inches from head of frame to centerline of hinge.
   3. Bottom hinge: Jamb manufacturer’s standard, but not greater than 12-1/2 inches from floor to centerline of hinge.
   4. Intermediate hinges: Equally spaced between top and bottom hinges and from each other.

5. Hinge mortise on door leaf: 1/4 inch to 5/16 inch from stop side of door.

3.3 FIELD QUALITY CONTROL

A. Supplier inspects installation and certifies hardware and installation has been furnished and installed in accordance with manufacturer's instructions.

3.4 ADJUSTING

A. Adjust hardware for smooth operation.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit adjacent work to damage hardware or hardware finish.

END OF SECTION

SECTION 08800
GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Glass and inserts for steel doors.

B. Perimeter sealant.

1.2 CODES AND STANDARDS

A. American Society for Testing and Materials (ASTM) Standard:
1. D2000-99 Rubber Products in Automotive Applications.

B. Flat Glass Marketing Association (FGMA) Glazing Manual, 1990.

1.3 SUBMITTALS

A. Manufacturer's product data and installation instructions for glazing and glazing components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. PPG Industries, Inc.,

B. Libbey-Owens-Ford Co.,

C. Ford Glass Division,

D. Approved equal.

2.2 MATERIALS

A. Wire reinforced, clear, tempered 1/4-inch thick glass.

B. Molded neoprene glazing gaskets: Molded or extruded neoprene gaskets of the profile and type required for airtight construction; complying with ASTM D2000 designation 2 BC 415 to 3 BC 620, black.

C. Setting blocks: Neoprene or ethylene propylene diene monomer (EPDM) 70-90 durometer hardness, with proven compatibility with sealant used.

D. Spacers: Neoprene or EPDM, 40-50 durometer hardness, with proven compatibility with sealant used.

PART 3 EXECUTION

3.1 INSTALLATION

A. Make all glass product installations airtight. Each installation shall withstand normal temperature changes and impact loading without failure, including loss or breakage of glass, failure of sealants or gaskets, deterioration of glazing materials, or other defects in the work.

B. Protect glass from edge damage during handling and installation and subsequent operation of glazed components of the work. Discard units with significant edge damage or other imperfections.

C. Comply with combined recommendations of manufacturers of glass and glazing products, FGMA Glazing Manuals, for uniformity of pattern, draw, bow, and similar characteristics.

D. Comply with manufacturer's recommendations in providing voids in jamb and head channels or use of filler rods to prevent exudation of sealants or compounds. Do not use filler rods or leave voids in sill channels.

E. Set units of glass in each series with uniformity of pattern, draw, bow, and similar characteristics.

F. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction, including natural causes, accidents, or vandalism. Clean and polish both faces of glass within four days of date of scheduled completion. Follow manufacturer's recommendations for final cleaning.

END OF SECTION

SECTION 09900
PAINTING

PART 1 GENERAL

1.1 WORK INCLUDED

A. Prepare shop primed surfaces which are to receive finish coat(s). Spray painting application or sandblasting shall not be permitted at the job site.

B. Finish surfaces are as indicated at end of this section including:
   1. Structural steel prime and paint, including ladders, ladder cage, and handrails.

C. Items not to be painted or finished:
   1. Union threads, and the like.

1.2 REFERENCES

A. AEDC Safety Standard:
   1. E19 Lead and Heavy Metals, 1997.

B. NACE International Standard:
   1. NO 5-95 Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating.

C. Steel Structures Painting Council (SSPC):
   1. SP 5-99 White Metal Blast Cleaning.

1.3 QUALITY ASSURANCE

A. All surface preparation work shall meet Structural Steel Painting Council guidelines. Apply primer in the shop the same day as cleaning.

B. Whenever possible, the coating product shall be a low VOC content (<3.5 lbs solvent/gallon), with coating container bearing low VOC label. Products containing Class I Ozone Depleting Chemicals shall not be used.

C. Prepare 12- x 12-inch sample of finishes when requested by the Government representative. When possible, apply finishes on identical type materials to which they will be applied on job. Identify each sample as to finish, formula, color name and number and sheen name and gloss units.

D. Inspect, clean, and touch-up all exposed bolt heads, surfaces left unpainted, and any exposed areas where the shop coat of primer has been damaged.

E. All coating products shall be new and of high industrial quality, and free of defects.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and/or reducing.

B. Provide adequate on-site storage facilities while work is in progress. Store paint materials at minimum ambient temperature of 60ºF in well ventilated area.

C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.5 PROTECTION

A. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection. Hardware, trim, and other items not requiring painting shall be protected or removed as required for proper application coatings. Such items shall be replaced after completion of painting.

B. Furnish sufficient drop cloths, shield and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.

C. Place cotton waste, cloths and material which may constitute a fire hazard in closed metal containers and remove daily from site.

D. Apply paint only on clean, dry surfaces and when temperature of surface and of surrounding atmosphere is above 60ºF. Coating shall not be done when surfaces may become damaged by rain, fog, mist, or condensation, or when it is anticipated that these conditions will prevail during the drying period, unless suitable enclosures to protect the surface are used.

PART 2 PRODUCTS

2.1 MATERIALS

A. Primers and topcoats: Type and brand listed herein or equivalent products as manufactured by Sherwin-Williams, Master Builders, or approved equal. All painting materials selected for coating systems for each type of surface shall be the product of a single manufacturer.

B. Top coatings: Pigments shall be full ground maintaining a soft paste consistency, capable of readily and uniformly dispersed to a complete homogeneous mixture.

C. Paints shall have good flowing and brushing properties and be capable of dry or curing free of streaks or sags.

D. Compatibility: All paint materials and equipment shall be compatible in use; finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating to be applied.

2.2 PAINTED SURFACES

A. Structural steel ladders, ladder cage, and handrails: Colors for new painted surfaces shall be aluminum.

PART 3 EXECUTION

3.1 INSPECTION

A. Finished surfaces will be inspected and approved by the Government representative. A wet-film gauge and micro-test Paint Inspector, or similar gauge graduated in 2-mil increments shall be furnished by the contractor for the Government's use.

B. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where the work of this section may properly commence. Report in writing to the Government representative any condition that may potentially affect proper application. Do not commence until such defects have been corrected.

C. Correct defects and deficiencies in surfaces which may adversely affect work of this section.

D. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process shall not fall on wet, newly painted surfaces. Where required, imperfections or holes in surfaces to be painted shall be repaired or filled prior to painting in an approved manner.

3.2 PREPARATION OF SURFACES

A. Carbon steel
Heavy-duty service, irregular surfaces.
1. Surface preparation shall be:
NACE No 5.
Water blast at 3,000 psi with emulsifier; use a clear water rinse.
Use with AEDC Safety Standard E19.

2. SSPC SP 5-91
   White metal sandblast. Size blasting aggregate to achieve a 2.0-3.0-mil surface profile pattern.
3. Surface preparation shall be followed by a primer coat before any flash surface rusting occurs.

3.3 PAINTING APPLICATIONS

A. Carbon steel
   Heavy duty service, irregular surfaces.

1.	Primer:	Zinc Clad 11, Ethyl Silicate, Inorganic Zinc-Rich Primer B69V3/B69D11 Sherwin-Williams or equal
	Coats:	One Full Coat
	DFT:	3.0 - 5.0 mils
	Application:	Spray
2.	Topcoats:	Water Based Epoxy Enamel Series B70 Gloss Hardener B60V15 Semi-Gloss Hardener B60V25
	Coats:	Two Full Coats
	DFT:	3.0 mils per coat. Total 9.0 mils (including primer)
	Application:	Spray
3.	Color:	Match roof color

3.4 CLEANING

A. As work proceeds and upon completion, promptly remove paint where spilled, splashed or splattered.

B. During process of work, keep premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.

C. Upon completion of work, leave premises neat and clean.

END OF SECTION

SECTION 15260
PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standards:
1. B209-00 Aluminum and Aluminum-Alloy Sheet and Plate.
2. C177-97 Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
3. C335-95 Steady-State Heat Transfer Properties of Horizontal Pipe Insulation.
4. C449-00 Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
5. C534-99 Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
6. C547-00 Mineral Fiber Preformed Pipe Insulation.
7. C921-96 Properties of Jacketing Materials for Thermal Insulation.
8. D1056-00 Flexible Cellular Materials-Sponge or Expanded Rubber.
9. E84-00 Surface Burning Characteristics of Building Materials.
10. E96-00 Water Vapor Transmission of Materials.

1.3 SUBMITTALS

A. Product data: Provide product description, list of materials and thickness for each service, and locations.

B. Manufacturer's installation instructions: Indicate procedures which ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Materials: Flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84.

B. Substituted insulation materials shall provide thermal resistance within 10 percent at normal conditions, as materials indicated.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Store insulation in original wrapping and protect from weather and construction traffic.

C. Protect insulation against dirt, water, chemical and mechanical damage.

PART 2 PRODUCTS

2.1 GLASS FIBERS

A. Manufacturers:
1. Owens Corning Corporation.
2. Armstrong.
3. Certainteed Products.
4. Approved Equal.

B. Insulation: ASTM C547; rigid molded, noncombustible.
1. 'K' ('ksi') Value: ASTM C335, 0.24 at 75º F.

C. Vapor barrier jacket:
1. ASTM C921, white kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
2. Moisture vapor transmission: ASTM E96; 0.02 perm (permeance of water vapor) inches.
3. Secure with self-sealing longitudinal laps and butt strips.

D. Tie wire: 18-gage stainless steel with twisted ends on maximum 12-inch centers.

E. Vapor barrier lap adhesive: Compatible with insulation.

F. Indoor vapor barrier finish: Vinyl emulsion type acrylic, compatible with insulation, white color.

G. Outdoor vapor barrier mastic: Vinyl emulsion type acrylic, compatible with insulation, white color.

H. Insulating cement: ASTM C449.

2.2 CELLULAR FOAM

A. Insulation: ASTM C534; flexible, cellular elastomeric, molded or sheet.
   1. 'K' ('ksi') value: ASTM C177 or C518; 0.27 at 75º F.
   2. Minimum service temperature: -40º F.
   3. Maximum service temperature: 220º F.
   4. Maximum moisture absorption: ASTM D1056; 1.0 percent by volume.
   5. Moisture vapor transmission: ASTM E96; 0.20 perm inches.
   6. Maximum flame spread: ASTM E84; 25.
   7. Maximum smoke developed: ASTM E84; 50.
   8. Connection: Waterproof vapor barrier adhesive.

B. Elastomeric foam adhesive:
   1. Air dried, contact adhesive, compatible with insulation.

2.3 JACKETS

A. Covering adhesive mastic: Compatible with insulation.

B. Canvas jacket:
   1. Fabric: ASTM C921, 6 oz/sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.
   2. Lagging adhesive: Compatible with insulation.

C. Aluminum jacket: ASTM B209.
   1. Thickness: 0.016 inch.
   2. Finish: Smooth.
   3. Joining: Longitudinal slip joints and 2-inch laps.
   4. Fittings: 0.016-inch thick die shaped fitting covers with factory attached protective liner.
   5. Metal jacket bands: 3/8-inch wide.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. On exposed piping, locate insulation and cover seams in least visible locations.

C. Insulated dual temperature pipes or cold pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory applied or field applied.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe.
   3. Finish with glass cloth and vapor barrier adhesive.
   4. PVC fitting covers may be used.
   5. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations.
   6. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

D. For insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with or without vapor barrier, factory applied or field applied.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe.
   3. Finish with glass cloth and adhesive.
   4. PVC fitting covers may be used.
   5. For hot piping conveying fluids 140º F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
   6. For hot piping conveying fluids over 140º F, insulate flanges and unions at equipment.

E. Inserts and shields:
   1. Application: Piping 2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert Location: Between support shield and piping and under the finish jacket.
   4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.

F. Finish insulation at supports, protrusions, and interruptions.

G. For pipe exposed in mechanical equipment rooms or in finished spaces below 10 feet above finished floor, finish with canvas jacket sized for finish painting.

H. For exterior applications, provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

END OF SECTION

SECTION 15290
DUCTWORK INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Ductwork insulation.

B. Duct liner.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM) Standards:
   1. C518-98 Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
   2. C612-00 Mineral Fiber Block and Board Thermal Insulation.
   3. E84-00 Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Product data: Provide product description, list of materials and thickness for each service, and locations.

B. Manufacturer's installation instructions: Indicate procedures which ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E84.

B. Substituted insulation materials shall provide thermal resistance within 10 percent at normal conditions.

1.5 QUALIFICATIONS

A. Applicator: Company specializing in performing the work of this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original factory packaging, labeled with manufacturer's density and thickness.

B. Store insulation in original wrapping and protect from weather and construction traffic.

C. Protect insulation against dirt, water, chemical, and mechanical damage.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 GLASS FIBER, FLEXIBLE

A. Insulation: flexible, noncombustible blanket.
   1. 'K' value: ASTM C518, 0.31 at 75º F.
   2. Maximum service temperature: 250º F.
   3. Maximum moisture absorption: 0.50 percent by volume.
   4. Density: 2.0 lb/cu ft.

B. Vapor barrier jacket:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
   2. Secure with pressure sensitive tape.

C. Vapor barrier tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

D. Tie wire: Annealed steel, 16 gage.

2.2 GLASS FIBER, RIGID

A. Insulation: ASTM C612; rigid, noncombustible blanket.
   1. 'K' value: ASTM C518, 0.31 at 75º F.
   2. Maximum service temperature: 250º F.
   3. Maximum moisture absorption: 0.50 percent by volume.
   4. Density: 2.0 lb/cu ft.

B. Vapor barrier jacket:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film.
   2. Secure with pressure sensitive tape.

C. Vapor barrier tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that ductwork has been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Insulated ductwork conveying air below ambient temperature:
   1. Provide insulation with vapor barrier jackets.
   2. Finish with tape and vapor barrier jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated ductwork conveying air above ambient temperature:
   1. Provide with or without standard vapor barrier jacket.
   2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. For ductwork exposed in mechanical equipment rooms or in finished spaces below 10 feet above finished floor, finish with canvas jacket sized for finish painting.

3.3 FLEXIBLE GLASS FIBER DUCTWORK INSULATION SCHEDULE

DUCTWORK	THICKNESS
Supply Ducts	1-1/2 Inch
Supply Ducts in Vertical Shafts (Cooling Systems)	1-1/2 Inch

END OF SECTION

SECTION 15530
REFRIGERATION PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Piping.

1.2 EPA REQUIREMENT

A. Each refrigerant recovery unit to be used on the job site shall be EPA certified. The recovery equipment has been tested according to Appendix C to Subpart F, 40 CFR 82. Refrigerant removal shall be accomplished by HVAC-trained, EPA-certified technicians (Type II Level) only. Whenever maintenance service or repair is performed, an EPA-certified technician shall supervise the work.

1.3 CODES AND REFERENCES

A. American Society of Heating, Refrigeration and Air-Conditioning Engineer (ASHRAE) Standard:
   1. 15-94 Safety Code for Mechanical Refrigeration.

B. American Society of Mechanical Engineers (ASME) Standards:
   1. B16.22-95 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
   2. B31.5-92 Refrigeration Piping.
   3. B31.9-96 Building Services Piping.

C. American Society for Testing and Materials (ASTM) Standards:
   2. B32-00 Solder Metal.
   3. B280-99 Seamless Copper Tubes for Air Conditioning and Refrigeration Field Service.

D. American Welding Society (AWS) Standard:
   1. A5.8-92 Filler Metals for Brazing and Braze Welding.

E. Code of Federal Regulations (CFR):
   1. 40 CFR 82 Protection of Stratospheric Ozone, 2000.

1.4 SUBMITTALS

A. Product data indicating pipe sizing.

B. Test reports indicating results of leak test and acid test.

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record exact locations of equipment and refrigeration accessories on record drawings.

1.6 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9.

B. Conform to ASHRAE 15.

C. Perform work in accordance with Southern Plumbing Code.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site.

B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completion sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 PIPING

A. Copper tubing: ASTM B280, Type ACR hard drawn or annealed.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: ASTM B32, solder Grade 95TA or AWS A5.8 cup silver braze.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and not interfere with use of space.

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

E. Provide non-conducting dielectric connections when joining dissimilar metals.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance for installation of insulation and access to valves and fittings.

H. Where pipe support members are welded to structural building frame, brush clean, and apply one coat of zinc rich primer to welding.

I. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finishing painting.

J. Test refrigeration system in accordance with ASME B31.5.

K. Upon completion of each refrigeration system, and at a time designated by the Contracting Officer, all refrigerant piping fabricated at the job site shall be pressure-tested for leaks and the entire system shall be tested as hereinafter specified. The tests shall be conducted in the presence of the representative of the Contracting Officer. The contractor shall furnish all instruments, test equipment, and personnel required for the tests.

L. After all components of the refrigerant system have been installed and the piping connected, the total refrigeration system shall be subjected to a pneumatic test. The pneumatic testing shall be done by charging system with some refrigerant charge and then adding sufficient amount of anhydrous carbon dioxide or dry nitrogen to bring the pressure to 300 psi for high side and 150 psi for low side. The system shall be proved tight and free of leaks by testing all joints with a halide torch or electronic leak detector and by allowing the leak test to remain on the system for 12 hours with no drop in pressure. Correction of 0.3 pound per square inch will be allowed for each degree of change in the initial and final temperature of the surrounding air, plus for an increase and minus for a decrease.

M. After the foregoing tests have been satisfactorily completed and the pressure relieved, the system shall be evacuated to an absolute pressure 500 microns. During evacuation of the system, the ambient temperature shall be higher than 34°F. No more than one system shall be evacuated at one time by one vacuum pump. When a vacuum of 500 microns is obtained, close off vacuum pump for 30 minutes and observe the magnitude and rate of pressure rise. If pressure continues to rise, check the system for leaks, repair them and repeat the evacuation procedure. If pressure rises to a point and holds, but the rise is excessive, repeat the evacuation and close off procedure until the rise is small enough to indicate that the system is dry. The contractor shall maintain records of test pressure and vacuum reading on each system and shall indicate length of time test pressures and vacuums were maintained. This record shall be submitted to the Contracting Officer at the completion of all the pressure and leak tests.

N. Fully charge completed system with refrigerant after test results are approved by the Contracting Officer.

END OF SECTION

SECTION 15810
DUCTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal ductwork.
   2. Ductwork fabrication.

B. Related Sections:
   1. Section 15060 - Hangers and Supports: Product requirements for hangers, supports and sleeves for placement by this section.
   2. Section 15850 - Air Outlets and Inlets.

1.2 CODES AND STANDARDS

A. American Society for Testing and Materials (ASTM) Standards:
   1. A36-00 Carbon Structural Steel.
   2. A90-99 Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
   3. A653-00 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. Sheet Metal and Air Conditioning Contractors (SMACNA) Standard:
   1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible, 1995.

C. Underwriters Laboratories Inc (UL) Standard:
   1. 181-98 Factory-Made Air Ducts and Connectors.

1.3 DEFINITIONS

A. Duct sizes: Inside clear dimensions.

B. Low pressure: Two inches water gage positive or negative static pressure and velocities less than 2,500 feet per minute.

PART 2 PRODUCTS

2.1 MATERIALS

A. General: Non-combustible or conforming to requirements for UL 181.

B. Steel ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz/sq ft for each side in conformance with ASTM A90.

C. Fasteners: Rivets, bolts, or sheet metal screws.

D. Sealant: Non-hardening, water-resistant, fire resistive, compatible with mating materials.

E. Hanger rod: ASTM A36, steel, galvanized; threaded both ends, or continuously threaded.

2.2 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide airfoil-turning vanes.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

PART 3 EXECUTION

3.1 INSTALLATION

A. Locate ducts to the extent possible to allow sufficient space around equipment to allow normal operating and maintenance activities.

B. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

D. Install duct hangers and supports in accordance with Section 15060.

E. All ductwork to be constructed as low-pressure ductwork.

END OF SECTION

SECTION 15810
DUCTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal ductwork.
   2. Ductwork fabrication.

B. Related Sections:
   1. Section 15060 - Hangers and Supports: Product requirements for hangers, supports and sleeves for placement by this section.
   2. Section 15850 - Air Outlets and Inlets.

1.2 CODES AND STANDARDS

A. American Society for Testing and Materials (ASTM) Standards:
   1. A36-00 Carbon Structural Steel.
   2. A90-99 Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
   3. A653-00 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. Sheet Metal and Air Conditioning Contractors (SMACNA) Standard:
   1. HVAC Duct Construction Standard - Metal and Flexible, 1995.

C. Underwriters Laboratories Inc (UL) Standard:
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1.3 DEFINITIONS

A. Duct sizes: Inside clear dimensions.

B. Low pressure: Two inches water gage positive or negative static pressure and velocities less than 2,500 feet per minute.

PART 2 PRODUCTS

2.1 MATERIALS

A. General: Non-combustible or conforming to requirements for UL 181.

B. Steel ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz/sq ft for each side in conformance with ASTM A90.

C. Fasteners: Rivets, bolts, or sheet metal screws.

D. Sealant: Non-hardening, water-resistant, fire resistive, compatible with mating materials.

E. Hanger rod: ASTM A36, steel, galvanized; threaded both ends, or continuously threaded.

2.2 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide airfoil-turning vanes.

C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

PART 3 EXECUTION

3.1 INSTALLATION

A. Locate ducts to the extent possible to allow sufficient space around equipment to allow normal operating and maintenance activities.

B. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

D. Install duct hangers and supports in accordance with Section 15060.

E. All ductwork to be constructed as low-pressure ductwork.

END OF SECTION

SECTION 15830
FANS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Centrifugal fans.

B. Related Sections:
   1. Section 15810 - Ducts.
   2. Section 15910 - Duct Accessories.
   3. Section 16124 - Wiring Connections.

1.2 REFERENCES

A. American Bearing Manufacturers Association (ABMA) Standard:
   1. 9-90 Load Ratings and Fatigue Life for Ball Bearings.

B. Air Movement and Control Association International, Inc. (AMCA) Standards:
   1. 99-86 Standards Handbook.
   2. 210-85 Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
   3. 301-90 Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

C. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Standard:
   1. HVAC Duct Construction Standards Metal and Flexible 1995.

1.3 SUBMITTALS

A. Product data: Data on fans and accessories including fan curves with specified operating point plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

B. Manufacturer's installation instructions: Fan manufacturer's instructions.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

C. Operation and maintenance data: Instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect motors, shafts, and bearings from weather and construction dust.

PART 2 PRODUCTS

2.1 CENTRIFUGAL FANS

A. Manufacturers:
   1. Penn Ventilator Dynamo.
   2. Loren Cook Co.
   3. Greenheck Corp.
   4. Approved equal.

B. Centrifugal exhaust or supply blowers shall be general-purpose belt driven utility fans with non-overloading backwardly inclined aluminum wheels. Fans shall be single inlet, single width AMCA arrangement 10 with CCW rotation.

C. Performance:
   1. Performance ratings: Conform to AMCA 210 and bear AMCA Certified Rating Seal.
   2. Sound ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.
   3. Fabrication: Conform to AMCA 99.
   4. Performance base: Sea level conditions.
   5. Temperature limit: Maximum 300ºF.
   6. Static and dynamic balance: Eliminate vibration or noise transmission to occupied areas.

D. Wheel and inlet: Single inlet, single outlet.
   1. Backward inclined: Steel construction with smooth curved inlet flange, back plate, backward curved blades welded or riveted to flange and back plate; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

E. Housing:
   1. Steel, spot welded for AMCA 99 Class I and II fans, braced, and designed to minimize turbulence with spun inlet bell and shaped cut-off.
   2. Factory finish before assembly to manufacturer's standard. Prime coating on aluminum parts is not required.

F. Bearings and sleeves:
   1. Bearings: Pillow block type, self-aligning, grease-lubricated ball bearings, with ABMA 9, L-10 life at 50,000.
   2. Shafts: Hot rolled steel, ground and polished, with key way, protectively coated with lubricating oil, and shaft guard.

3. V-belt drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 hp and under, selected so required rpm is obtained with sheaves set at mid-position. Matched belts and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of motor.
4. Belt guard: Fabricate to SMACNA Standard; 0.106-inch thick, 3/4-inch diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.

PART 3 EXECUTION

3.1 INSTALLATION

A. Secure fans with cadmium plated steel lag screws to structure.

B. Install backdraft dampers on inlet to ventilators used in relief air or fresh air applications.

C. Install safety screen where inlet or outlet is exposed.

D. Provide sheaves required for final air balance.

3.2 DEMONSTRATION

A. Demonstrate fan operation and maintenance procedures.

3.3 PROTECTION OF FINISHED WORK

A. Do not operate fans until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

SECTION 15850
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Louvers.
2. Gooseneck hoods.

1.2 CODES AND STANDARDS

A. Air Movement and Control Association International, Inc (AMCA) Standard:
1. 500-89 Test Methods for Louvers, Dampers, and Shutters.

B. Sheet Metal and Air Conditioning Contractors (SMACNA) Standard:
1. HVAC Duct Construction Standard - Metal and Flexible, 1995.

1.3 SUBMITTALS

A. Product data: Sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.4 QUALITY ASSURANCE

A. Test and rate louver performance in accordance with AMCA 500.

PART 2 PRODUCTS

2.1 LOUVERS

A. Product description: Stationary, drainable.

B. Type: 4-inch deep with blades on 45 degree slope, channel frame.

C. Fabrication: 16-gauge thick galvanized steel, welded assembly, with factory fluoropolymer spray finish to match standing seam roof.

D. Insect screen: Insect screen with 18- by 14-inch mesh.

E. Mounting: Furnish with interior angle flange for installation.

2.2 SIDE WALL RETURN REGISTERS/GRILLES

A. Extruded aluminum anodized finish, 45-degree setting, 1/2-inch spacing horizontal or vertical bars.

B. Fabricate one 3/4-martin frame with countersunk screw mounting.

C. Fabricate of steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Where not individually connected to exhaust fans, provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify inlet/outlet locations.

3.2 INSTALLATION

A. Install louvers to ductwork with airtight connection.

B. Provide manual balancing dampers on outside air intake ducts.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features.

END OF SECTION

SECTION 15850
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Louvers.
2. Gooseneck hoods.

1.2 CODES AND STANDARDS

A. Air Movement and Control Association International, Inc (AMCA) Standard:
1. 500-89 Test Methods for Louvers, Dampers, and Shutters.

B. Sheet Metal and Air Conditioning Contractors (SMACNA) Standard:
1. HVAC Duct Construction Standard - Metal and Flexible, 1995.

1.3 SUBMITTALS

A. Product data: Sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.4 QUALITY ASSURANCE

A. Test and rate louver performance in accordance with AMCA 500.

PART 2 PRODUCTS

2.1 LOUVERS

A. Product description: Stationary, drainable.

B. Type: 4-inch deep with blades on 45 degree slope, channel frame.

C. Fabrication: 16-gauge thick galvanized steel, welded assembly, with factory fluoropolymer spray finish to match standing seam roof.

D. Insect screen: Insect screen with 18- by 14-inch mesh.

E. Mounting: Furnish with interior angle flange for installation.

2.2 SIDE WALL RETURN REGISTERS/GRILLES

A. Extruded aluminum anodized finish, 45-degree setting, 1/2-inch spacing horizontal or vertical bars.

B. Fabricate one 3/4-martin frame with countersunk screw mounting.

C. Fabricate of steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish.

D. Where not individually connected to exhaust fans, provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify inlet/outlet locations.

3.2 INSTALLATION

A. Install louvers to ductwork with airtight connection.

B. Provide manual balancing dampers on outside air intake ducts.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features.

END OF SECTION

SECTION 15910
DUCTWORK ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Duct access doors.

B. Duct test holes.

C. Flexible duct connections.

1.2 REFERENCES

A. National Fire Protection Association (NFPA) Standard:
   1. 90A-99 Installation of Air Conditioning and Ventilating Systems.

B. Sheet Metal and Air Contractors' National Association (SMACNA) Standard:
   1. HVAC Duct Construction Standards - Metal and Flexible.

1.3 SUBMITTALS

A. Shop drawings: Indicate for shop fabricated assemblies including volume control dampers and duct access doors.

B. Product data: Provide for shop fabricated assemblies including volume control dampers and duct access doors. Include electrical characteristics and connection requirements.

C. Manufacturer's installation instructions: Indicate for fire dampers.

D. Record actual locations of access doors.

PART 2 PRODUCTS

2.1 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet metal cover.
   1. Less than 12 inches square: Secure with sash locks.
   2. Up to 18 inches square: Provide two hinges and two sash locks.
   3. Up to 24 x 48 inches: Three hinges and two compression latches.
   4. Larger sizes: Provide an additional hinge.

C. Access doors with sheet metal screw fasteners are not acceptable.

2.2 DUCT TEST HOLES

A. Temporary test holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent test holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.3 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Connector: Fabric crimped into metal edging strip.
   1. Fabric: Fire-retardant neoprene coated woven glass fiber fabric in compliance with NFPA 90A.
   2. Net fabric width: Approximately 6 inches.
   3. Metal: 3 inches wide, 24 gage galvanized steel.

C. Leaded vinyl sheet: Minimum 0.55-inch thick, 0.87 lbs/sq ft, 10 dB attenuation in 10 to 10,000 Hz range.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 15890 for duct construction and pressure class.

B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8-inch by 8-inch size for hand access, 18-inch by 18-inch size for shoulder access, and as indicated. Review locations prior to fabrication.

C. Provide duct test holes where indicated and required for testing and balancing purposes.

END OF SECTION

SECTION 16110
RACEWAYS

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to conduit, conduit fittings, conduit bodies, hangers, supports, and clamps required for a complete electrical raceway between boxes and devices as indicated on the drawings and specified herein.

1.2 CODES AND STANDARDS

A. National Fire Protection Association (NFPA) Standard:
   1. 70-98 National Electrical Code (NEC).

B. Underwriters Laboratories, Inc. (UL) Standards:
   1. 1-00 Flexible Metal Conduit.
   2. 6-00 Rigid Metal Conduit.
   3. 360-97 Liquid-Tight Flexible Steel Conduit.
   4. 514B-98 Fittings for Cable and Conduit.
   5. 797-00 Electrical Metallic Tubing.

PART 2 PRODUCTS

2.1 MATERIALS

A. Rigid metal conduit: UL 6.

B. Fittings for rigid metal conduit: UL 514B.

C. Clamps, straps, and hangers: Malleable iron or steel, zinc or cadmium plated.

D. Flexible metal conduit: UL 1.

E. Fittings for flexible metal conduit: UL 514B.

F. Conduit bodies: Aluminum with cover and gasket.

G. Sealing compound: Silicone-based flexible sealant.

H. Liquid-tight flexible metal conduit: UL 360.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install exposed conduit parallel or perpendicular to walls, structural members, or intersections of vertical planes or ceilings.

B. Install rigid conduit in accordance with the requirements of Article 346 of the NEC.

C. Provide rigid conduit bushings in accordance with Article 346-8 of the NEC.

D. Make rigid conduit bend radii in accordance with Table 346-10 of the NEC.

E. Support rigid conduit with pipe straps, hangers, or clamps at intervals not exceeding those specified in Articles 346-2 and 348-12 of the NEC.

F. Use stuff boxes and cork fittings to prevent entrance of water and debris during construction prior to completion of conduit installations.

G. Provide gaskets for condulets and use compatible sealing compound with the conductor insulation to prevent water entry.

H. Make conduit electrically and mechanically continuous in accordance with Articles 300-10 and 300-12 and ground it in accordance with Article 300-9 of the NEC.

I. Install flexible metal conduit in accordance with Article 350 of the NEC. In wet locations, install liquid-tight flexible conduit in accordance with Article 351 of the NEC. Use a short section of liquid-tight flexible conduit at lighting connections and components subject to vibration or periodic removal for maintenance.

J. Do not weld support conduit brackets or other items to pressure piping of ducting, or structural members except as indicated or by specific approval of the Government representative.

K. Cut conduit square using saw or pipecutter; debur cut ends.

END OF SECTION

SECTION 16120
WIRES AND CABLES

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to 600-volt wire and cable as indicated on the drawings and specified herein.

1.2 CODES AND STANDARDS

A. American Society for Testing and Materials (ASTM) Standard:
   1. B8-99 Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

B. National Fire Protection Association (NFPA) Standard:
   1. 70-98 National Electrical Code (NEC).

C. Underwriters Laboratories, Inc. (UL) Standard:
   1. 1581-98 Electrical Wires, Cables, and Flexible Cords.

1.3 SUBMITTALS

A. Product data: Manufacturers' information and verification that materials meet the specification outlined in paragraph 2.1.

PART 2 PRODUCTS

2.1 MATERIALS

A. Wires meeting UL 1581 and ASTM B8: Minimum working voltage of 600 volts conforming to UL 1581 unless otherwise shown; copper conductor material; UL Type THW or XHHW insulation for wires AWG No. 8 and larger; UL Type THW, THWN, or THHN insulation for wires AWG No. 10 or smaller.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install wires and cables in raceways. Complete raceway installation prior to pulling or installing wires and cables.

B. Make wires and cables mechanically and electrically continuous between outlets and devices in accordance with Article 300-13 of the NEC.

C. Protect wires and cables from physical damage to the conductor, insulation, and jacket during insertion into raceways. Pulling lubricants, if used, shall not cause deterioration of the insulation and jackets of the wires and cables.

D. Fill raceway in accordance with Article 348-6 of the NEC.

E. Support wires and cables in vertical raceways in accordance with Article 300-19 of the NEC.

F. Group wires and cables in raceways as shown on the drawings.

G. Prior to making final connections, test all wires and cables rated at 600 V or less, in the presence of the Government representative, as follows:
   1. Test each conductor for continuity from end to end using an ohmmeter, low voltage telephone, buzzer, low voltage lamp, or other testing device designed to measure amperage, voltage, and resistance.
   2. Test each conductor for insulation resistance to ground and to each other conductor in the same cable or raceway using a megohm tester (megger) and applying a DC voltage of at least 80 percent of the conductor insulation voltage rating. Insulation resistance shall exceed 500 megohms.
   3. Do not energize any conductor prior to completing the required tests and receiving concurrence from the Government representative.

END OF SECTION

SECTION 16124
WIRE CONNECTIONS AND DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Proper connections and terminations as indicated on the drawings and specified herein.

1.2 RELATED SECTIONS

A. Section 16120 - Wires and Cables.

PART 2 PRODUCTS

2.1 MATERIALS

A. Wire nuts shall be a flame-retardent thermoplastic shell with a double thick protective end cap and an expanding wire spacing on the inside and contoured wings on the outside.

B. Electrical tape shall be 7-mils vinyl plastic insulation, corrosion-resistant, black, 3/4-inch width.

C. Conductive anti-seize compound shall be a homogenized blend of colloidal copper and rust and corrosion inhibitor that flows easily into the threads.

PART 3 EXECUTION

3.1 INSTALLATION

A. Joints between conductors No. 14AWG through No. 8AWG at fixtures, devices, and junction points shall be made with insulated spring type wire nuts of the wing-nut design.

B. Conductive anti-seize compound shall be used on all fuse ferrules and blades, switch wiping contacts, ground connections, and all copper to copper lugs and connections.

END OF SECTION

SECTION 16130
BOXES

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to device, pull, and junction boxes as indicated on the drawings and specified herein.

1.2 CODES AND STANDARDS

A. National Fire Protection Association (NFPA) Standard:
   1. 70-98 National Electrical Code (NEC).

B. Underwriters Laboratories, Inc. (UL) Standards:
   1. 50-99 Enclosures for Electrical Equipment.
   2. 514A-99 Metallic Outlet Boxes.
   3. 514B-98 Fittings for Cable and Conduit Fourth Edition.

1.3 SUBMITTALS

A. Manufacturer's descriptive literature (catalog cuts) of electrical boxes proposed for incorporation into the work.

PART 2 PRODUCTS

2.1 MATERIAL

A. Device boxes: UL 514A and NEC Article 370.

B. Junction boxes: UL 50.

C. Fittings: UL 514B and NEC Article 370.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide a box or fitting for each wiring device and fixture as required in accordance with Article 300 of the NEC.

B. Provide a pull box every 100 feet of conduit run or when the number of bends requires a box for ease of wire installation. Do not allow cumulative bends between pull boxes or device outlet boxes to exceed 360 degrees.

C. Securely anchor outlet boxes and set them level and plumb in accordance with Article 370 of the NEC.

D. Number of conductors in boxes shall not exceed the maximum permitted by Tables 370-6(a) and 370-6(b) of the NEC.

END OF SECTION

SECTION 16140
WIRE DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Switches, receptacles, and cover plates.

1.2 RELATED WORK

A. Section 16130 - Boxes.

1.3 REFERENCES

A. National Electrical Manufacturers' Association (NEMA) Standards:
   1. WD 1-99 General Color Requirements for Wiring Devices.
   2. WD 6-97 Wiring Devices - Dimensional Specifications.

B. National Fire Protection Association (NFPA) Standard:
   1. 70-98 National Electrical Code (NEC).

C. Underwriters Laboratories (UL) Standard:
   1. 498-99 Attachment Plugs and Receptacles.

PART 2 PRODUCTS

2.1 MATERIALS

A. Color of devices shall be smooth ivory plastic or as approved by Contracting Officer.

B. Conform to UL 498, NEMA WD-1 and NEMA WD-6.

C. Lighting switches shall be 120-VAC in accordance with NEC Article 380, quiet type, 20-ampere, back and side wires grounding type with toggle handle.

D. Device plates shall be smooth finish, ivory thermoplastic, a minimum of 0.100-inch thick. Plates shall be secured to devices or boxes with matching color screws.

E. Receptacles shall be Specification Grade, 125 VAC, straight blade device, NEMA 5-20R, 2-pole, 3-wire, 20-ampere, duplex type, back and side wired with green grounding screw.

PART 3 EXECUTION

3.1 INSTALLATION

A. Mount all switches 4 feet above the finished floor unless otherwise shown.

B. Mount all receptacles 18 inches above finished floor unless otherwise shown, mount receptacles with grounding slot at bottom.

C. Devices shall be mounted plumb.

END OF SECTION

SECTION 16190
SUPPORTING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. All supporting members, devices, hangers, clips, and fasteners required to properly support and fasten all electrical equipment, as indicated on the drawings and as specified herein.

1.2 CODES AND STANDARDS

A. National Fire Protection Association (NFPA) Standard:
1. 70-98 National Electrical Code (NEC).

PART 2 PRODUCTS

2.1 MATERIALS

A. Support channel shall be 1-5/8 by 1-5/8 inches by No. 13 gauge with all matching accessories and fittings.

B. Support angles, unless specifically noted otherwise on drawings, shall be 3-1/8 by 1-5/8 inches by No. 12 gauge slotted angle.

C. Threaded rod shall be 3/8-inch diameter minimum.

D. Toggle bolts shall be 3/16-inch diameter minimum.

E. Self-drilling anchors shall be 3/8-inch minimum.

F. Screws shall be self-tapping pan head type or machine screws.

G. Jack chain shall be No. 9 minimum.

H. Support wire shall be No. 9 gauge steel.

I. Fasteners shall be used to support conduit, outlet boxes and lighting fixtures to structural members. Fasteners shall be of a type designed and intended for use in the base material to which the material or support is to be attached.

J. All equipment shall be either hot dip galvanized or cadmium plated. Paint all field cut ends of supporting equipment with galvanizing paint to prevent rusting.

2.2 METHOD ANCHORING

A. Solid masonry and concrete.
   1. Steel expansion anchors not less than 1/4-inch bolt size embedded not less than 1-1/8 inches into structure.
   2. Power set fasteners not less than 1/4-inch diameter with depth of penetration not less than 3 inches.
   3. Anchors of fasteners attached to concrete ceilings shall be vibration resistant.

B. Hollow masonry.
   1. Toggle bolts: Toggle bolts supported only by plaster are not acceptable.

C. Metal structures.
   1. Machine screws.

D. Metal studs.
   1. Sheet metal screws and extension bars or fasteners.

E. Unacceptable anchors.
   1. Attachment by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking is not acceptable. Chain, wire, or perforated strap shall not be used to support or fasten conduit.

PART 3 EXECUTION

3.1 INSTALLATION

A. Support raceway and conduit at intervals not exceeding those specified in articles 366-2 and 388-12 of the NEC.

B. Support boxes independently from the conduit. Use structural members where possible and fasten boxes as specified in paragraph 2.2. In metal stud partitions fasten boxes to stud box or extension bar hangers. Fasten hangers between two studs.

C. Provide all fixture supports in accordance with the NEC.

END OF SECTION

SECTION 16195
ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates and labels.

B. Conduit markers.

1.2 CODES AND STANDARDS

A. National Fire Protection Association (NFPA) Standard:
1. 70-98 National Electrical Code (NEC).

1.3 SUBMITTALS

A. Product data: Furnish catalog data for nameplates and labels.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of the NEC.

B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer, laminated plastic, white letters on black background.

B. Locations: Each electrical distribution and control equipment enclosure.

C. Letter size:
1. Use 1/8-inch letters for identifying individual equipment and loads.
2. Use 1/4-inch letters for identifying grouped equipment and loads.

2.2 CONDUIT MARKERS

A. Description: Black letters on orange background with the word "ELECTRIC" on marker.

B. All exposed surface-mounted conduit.

C. Spacing: Within 20 feet of electrical enclosures and at 60-foot intervals in long runs of conduit. Install markers in conspicuous places near entrances or exits.

D. System: 120/208 volt as indicated on drawings.

E. Letter size:
   1. Use 1/2-inch letters for conduit size 1 1/4-inch or less.
   2. Use 3/4-inch letters for conduit size 1 1/2 through 2 inches.
   3. Use 1 1/4-inch letters for conduit size 2 1/2 through 6 inches.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates or markers.

3.2 APPLICATION

A. Install nameplate parallel to equipment lines.

B. Secure nameplate to equipment front with screws.

C. Secure nameplate to outside surface of door on panelboard.

END OF SECTION

SECTION 16440
DISCONNECT SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section applies to safety switches as indicated on the drawings and specified herein.

1.2 CODES AND STANDARDS

A. National Electrical Manufacturer's Association (NEMA) Standards:
   1. 250-97 Enclosures for Electrical Equipment (1000 Volt Maximum).
   2. ICS 6-93 Industrial Control and Systems Enclosures.

B. National Fire Protection Association (NFPA) Standard:
   1. 70-98 National Electrical Code (NEC).

C. Underwriters Laboratories (UL) Standard:
   1. 98-98 Enclosed and Dead-Front Switches.

1.3 SUBMITTALS

A. A complete itemized listing of equipment and materials proposed for incorporation into the work that includes an item number, the quantity of items proposed and the name of the manufacturer of each item.

B. Manufacturer's descriptive literature (catalog cuts) of each item proposed for incorporation into the work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Safety switches: Class 1 in accordance with NEMA ICS 6 and 250, and UL 98.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install disconnecting devices as shown on the drawings, and identify in accordance with Article 110-22 of NEC.

B. Locate each disconnecting device so that it is readily accessible to the equipment serviced, and in accordance with Article 430 and other related Articles of the NEC.

C. Mount motor and circuit disconnects in accordance with Articles 110-13(a) and 300-11 of the NEC.

D. Ground motor and circuit disconnects in accordance with Article 250 of the NEC.

E. Install fuses as shown on the drawings.

F. Identify disconnect with an engraved laminated plastic nameplate (3/4-inch white letters on a black background) permanently attached to the front of the cover with a legend describing the equipment served and fuse size (when applicable).

END OF SECTION

SECTION 16450
GROUNDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding of metallic conduits, raceways, supports, motors, controls, cabinets, and equipment, as indicated on the drawings and specified herein.

1.2 RELATED SECTIONS

A. Section 16110 - Raceways.

B. Section 16120 - Wires and Cables.

C. Section 16500 - Lighting.

1.3 CODES AND STANDARDS

A. National Fire Protection Association (NFPA) Standard:
1. 70-98 National Electrical Code (NEC).

PART 2 PRODUCTS

2.1 MATERIALS

A. Connections at ground bus in panelboards shall be made with UL approved lugs.

B. Grounding conductor shall be copper and sized in accordance with NEC 250-95 and colored in accordance with NEC 210-5.

PART 3 EXECUTION

3.1 INSTALLATION

A. Grounding system shall be installed in accordance with Article 250 of the NEC.

B. Provide separate grounding conductor in each and every conduit and branch circuit wiring.

C. The metallic case of each lighting fixture shall be bonded to the grounding conductor.

D. Ground all exposed non-current-carrying metallic parts of electrical equipment, conduit systems, junction boxes, and neutral conductors to the ground grid.

END OF SECTION

SECTION 16480
MOTOR CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to motor starters as indicated on the drawings and specified herein.

1.2 CODES AND STANDARDS

A. National Electrical Manufacturer's Association (NEMA) Standard:
   1. 250-97 Enclosures for Electrical Equipment (1000-Volts Maximum).

B. National Fire Protection Association (NFPA) Standard:
   1. 70-98 National Electrical Code (NEC).

1.3 SUBMITTALS

A. A complete itemized listing of equipment and materials proposed for incorporation into the work that includes an item number, the quantity of items proposed, and the name of the manufacturer of each item.

B. Manufacturers' descriptive literature (catalog cuts) of each item proposed for incorporation into the work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Motor starters: Rated in accordance with Article 440-41 of the NEC for hermetic motors and in accordance with Article 430-83 of the NEC for non-hermetic motors; UL-listed line voltage magnetic type with thermal overload and low voltage protection, auxiliary interlocks, NEMA 1 general purpose enclosures conforming to NEMA 250 unless otherwise shown. Combination starters of the fusible disconnect type may be used.

B. Manual motor starters: Manually-operated toggle switch equipped with one thermal overload relay mounted in NEMA 1 enclosure.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide each motor with an individual motor starter unless the application is specifically excepted by Article 430 and 440 of the NEC.

B. Install motor starters in accordance with the manufacturer's recommendations.

C. Install thermal units sized in accordance with motor manufacturer recommendations in all motor starters. Do not jump or bypass thermal overloads.

D. Identify each motor starter with an engraved laminated plastic nameplate (1/4-inch white letters on black background) permanently attached to the front of the cover with a legend describing the equipment served (Example: Air Handling Unit No. 1 Motor).

END OF SECTION

SECTION 16500
LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Lighting fixtures and lamps.

B. Ballast and accessories.

1.2 CODES AND STANDARDS

A. National Fire Protection Association (NFPA) Standard:
1. 70-98 National Electrical Code (NEC).

1.3 DELIVERY, STORAGE AND HANDLING

A. Store indoors in dry locations.

B. Do not mar or scratch finish.

C. Protect from damage after installation.

1.4 COORDINATION

A. Confirm compatibility and interface of other materials with fixtures and ceiling systems. Report any discrepancies to the Contracting Officer, and defer ordering until clarified.

1.5 SUBMITTALS

A. A complete itemized listing of equipment and materials proposed for incorporation into the work that includes an item number, the quantity of items proposed, and the name of the manufacturer of each item.

B. Manufacturer’s descriptive literature for lighting.

1.6 QUALITY ASSURANCE

A. Each major component of equipment shall have, as a minimum, the manufacturer's name, address, and catalog or style number on a nameplate securely attached to the item of equipment. Provide nameplates for individual items of electrical equipment shall be as specified in referenced publications and shall be provided on each item of equipment. All electrical equipment shall bear the UL seal of approval.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lamps of the wattage and type listed. High efficiency, low-wattage with a lamp current crest factor (LCCF) < 1.6. Lamps shall be energy saving type, (General Electric, Westinghouse, Sylvania, or approved equal).

B. Fixtures of the wattage and type listed (General Electric, Westinghouse, Lithonia, or approved equal).

C. Ballast shall be for high-intensity discharge fixtures. Use high-efficiency ballast (General Electric, Westinghouse, Lithonia, or approved equal).

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide lighting fixtures with photoelectric switches as shown on the drawings.

B. Provide and install lighting fixtures in accordance with NEC 410.

END OF SECTION

SECTION 16720
ALARM AND DETECTION SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. This section applies to alarm and detection systems as indicated on the drawings and specified herein.

RELATED SECTIONS

A. Section 16110 – Raceways.

B. Section 16124 - Wire Connections and Devices.

C. Section 16130 – Boxes.

D. Section 16190 - Supporting Devices.

1.3 REFERENCES

A. National Fire Protection Association (NFPA) Standards:
   1. 70-98 National Electrical Code.
   2. 72-99 National Fire Alarm Code.
   3. 101-00 Life Safety Code.

1.4 SUBMITTALS

A. Shop drawings, point-to-point wiring diagram, and product data sheets on each item of equipment to be furnished.

B. Catalog cut sheets for each component of the system (including wiring). Each catalog cut sheet shall certify UL listing for each component for its application.

C. Itemized sequence of operation for the entire system.

D. Operation and maintenance manuals.

E. Fire alarm system test results.

F. Upon approval of the fire alarm submittals by the Contracting Officer, three copies of the approved submittals to the base fire chief.

1.5 SYSTEM DESCRIPTION

A. Fire alarm system: NFPA 72; automatic fire alarm system.

B. System supervision: Provide electrically-supervised system, with supervised alarm initiating and alarm signaling circuits. Occurrence of single ground or open condition in initiating or signaling circuit places circuit in TROUBLE mode. Component or power supply failure places system in TROUBLE mode. Occurrence of single ground or open condition on alarm initiating circuit does not disable that circuit from transmitting in ALARM. Occurrence of single ground or open condition on signaling circuit does not disable that circuit from transmitting in ALARM.

C. Alarm sequence of operation: Actuation of manual fire alarm station or automatic initiating device causes system to enter ALARM, which includes the following operations:
   1. Sound and display local fire alarm signaling devices with zone-coded signal.
   2. Transmit zone-coded signal to central fire station connection.
   3. Indicate location of alarm zone on fire alarm control panel and on remote annunciator panel.
   4. Transmit signal to building mechanical systems to initiate shutdown of fans and damper operation.
   5. Transmit signal to release door hold-open devices by zone.
   6. Send “sprinkler operated” signal to central fire station on separate channel when flow switch activated.

D. Alarm reset: Key-accessible RESET function resets alarm system out of ALARM if alarm initiating circuits have cleared.

E. Trouble sequence of operation: System trouble, including grounding or open circuit of supervised circuits, or power or system failure causes system to enter TROUBLE mode, including the following operations:
   1. Visual and audible trouble alarm by zone at control panel.
   2. Visual and audible trouble alarm at annunciator panel.
   3. Manual ACKNOWLEDGE function at control panel silences audible trouble alarm; visual alarm is displayed until initiating trouble is cleared.
   4. Transmit trouble signal to municipal connection.

PART 2 PRODUCTS

2.1 MATERIALS

A. Heat detector: Rate anticipation at 194ºF, Monaco part number 721-107-00, or equal.

B. Power supervision module: End-of-line relay, 24 VDC, (Monaco Part No. 790-004-00, or equal).

C. Fire alarm cable: Solid copper conductors, insulated, color coded, twisted, and enclosed in an overall outer jacket. 18 AWG/6 conductor, Monaco Part No. 621-060-00, or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Verify proper operation of existing alarm panel and existing penthouse detector before start of work

B. Install system in accordance with manufacturer's instructions. Conform to NFPA 70, NFPA 72, and NFPA 101.

C. Furnish and install all wiring, conduit and boxes per the manufacturer’s instructions. All wiring shall be a minimum of fourteen (14) AWG, uniformly color coded throughout the system, and UL approved for each application directed by the manufacturer.

D. Install wiring in conduit.

E. Automatic detector installation: NFPA 72.

3.2 TESTING

A. Test fire alarm system
   1. Test each installed fire detection device for proper alarm operation according to the manufacturer’s instructions.
   2. First test detection devices individually for proper response.
   3. Check the fire alarm control panel for proper response to activation of detection devices.
   4. Reset the fire alarm control panel to normal condition after each test.
   5. Make a complete fire alarm system test to verify radio transmission and receipt of “Fire Alarm” and “Trouble Alarm” reporting at the AEDC Fire Department, Building 251.

3.3 FIRE ALARM WIRE AND CABLE COLOR CODE

A. Provide fire alarm circuit conductors with color coded insulation, or use color coded tape at each conductor termination and in each junction box as follows:
   1. Power branch circuit conductors: Black, green, white.
   2. Initiating device circuit: Black, red.
   3. Detector power supply: Violet, brown.
   4. Signal device circuit: Blue (positive), white (negative).
   5. Central station trip circuit: Orange, orange.
   6. Central station fire alarm loop: Black, white.

END OF SECTION